"BUY NOW AND SHIP NOW" NUMBER
PRICE 50 CENTS

Railway Age

FIRST HALF OF 1921—NO. 1 NEW YORK—JANUARY 7, 1921—CHICAGO SIXTY-SIXTH YEAR

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Railway Age

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(Established in April, 1856)

SIXTY-SIXTH YEAR

1921
FIRST HALF

EDITORIAL
Railway Age

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On "Buying Now" and "Shipping Now"

LARGE PARTS OF THE CONTENTS of this issue of the *Railway Age* will run counter to the views and inclinations of many of those for whose reading they are especially intended. The parts referred to are those containing articles designed to present the reasons why shippers who can do so should "ship now," and railways that can do so should "buy now." Many shippers believe that they should at present ship no more freight than they have to, and many railways believe that they should not at present buy any more equipment and materials than they have to.

It is always easier to go with the tide than against it. It is always easier to win the approval of people by telling them what they already believe than by telling them what they don't believe. It is always easier to influence people to do what they are already inclined to do than to influence them to do what they are inclined not to do. Of no class of affairs are the foregoing statements more true than of economic and business affairs. "Mob psychology" plays a very large part in such affairs, and when the tide has set in the general direction of shipping or not shipping, of buying or not buying, most people not only go with the tide, but are inclined to suspect the sincerity or intelligence of those who advise going against the tide. And yet this "mob psychology" which prompts most people to do what it is the general tendency to do is one of the principal causes of the violent changes that occur and the heavy losses that are incurred in industry and business.

The longer rises and falls which occur in general business activity are due to economic laws the operation of which no legislation, no public sentiment and no action by private combinations or persons can prevent. But even the effects produced by the operation of laws of nature can be aggravated or mitigated by human action. No human action can prevent the weather from getting hot in summer or cold in winter, but human beings can protect themselves from sun stroke in hot weather and can wear clothing and provide heating systems for their homes that will keep them from freezing in winter. Similarly, human action can prevent the operation of economic laws from causing a large part of the harm that they now do cause.

1. Fatalism Regarding Business Affairs

In ancient times men were very fatalistic in their attitude toward economic, as well as toward natural, laws. They considered it inevitable that there should be bountiful crops in some parts of the world and millions starving in other parts of the world. They could conceive of no means by which food could be transported in sufficient quantities from places where it was abundant to the places where there was famine. A Chinaman even at present considers it as inevitable that many persons should starve annually in his country as that there should be seasonable changes of temperature.

Nobody in the United States believes that numerous people must starve in this country every year, but there are still many who are so fatalistic in their views of economics and business as to believe that violent fluctuations, resulting in periods of great prosperity, followed by periods of profound depression and great loss and suffering, are inevitable; and that to attempt to arrest a general tendency in either direction is as futile as was the attempt of Mrs. Partington to sweep back the sea with her broom.

The *Railway Age* is publishing this "Buy Now—Ship Now" number partly because it does not accept this economic philosophy, and partly because it believes that there exist at present certain special business and transportation conditions which make it peculiarly urgent that the policies of "Buying Now" and "Shipping Now" should be adopted.

Since the economic activities of the United States are the activities of human beings working together in an organized society, we believe it is possible for these human beings to be so informed and influenced that large numbers of them will do things which will tend to shorten industrial depressions and make them less disastrous. The principal reason why the country has periods of such feverish and unhealthy business activity and inflation, followed by periods of great depression, unemployment, loss and suffering is, that it has times when most people go forward with production and buying on the largest possible scale almost regardless of how high production costs and prices mount, and other times when production and buying occur on only a very small scale regardless of how low costs of production and prices descend. It would promote the welfare of all classes if business activity could be restrained in periods of the former kind, and stimulated in periods of the latter kind.

2. Prices Increasing—Everybody Buys; Prices Declining—Nobody Buys

We have just passed through a period of the former kind. It has been superseded, with unexpected suddenness and violence, by a period of the latter kind. Almost everybody contributed to the excesses of the former period, and now almost everybody is contributing to the excesses of the latter. Almost everybody bought madly while prices were going up.

In consequence, acute shortages of materials, of labor and of transportation developed. Now, when prices are going down, almost everybody is refusing to buy or ship anything that he does not need to buy or ship at once, and, in consequence, there are great surpluses of productive and transportation capacity, and of labor.

It is axiomatic that action and reaction follow each other, and that the violence of each is in proportion to the violence of the other. Of nothing is this more true than of business activity and prices. The longer production is curtailed, prices decline and a surplus of transportation capacity exists, the more certain it will become that when business activity does revive the demands for products and for transportation will be unprecedented and that prices will advance again. The present business situation is largely due to a "buyers' strike" of unprecedented extent and violence. Because prices, after having gone so high, have declined so much in many lines in such a short time, many persons seem to believe that they will continue to descend without a pause until they reach their pre-war level. Not only is any such continuous fall of prices entirely improbable, but if it should occur it would be ruinous to every class of the people of the United States. It would be impossible to readjust costs of production fast enough to cope with such a decline of prices. Most industrial and commercial concerns would be bankrupted and most of their employees would be thrown out of work. What is needed is a reduction of prices by stages, each stage of the decline being followed by a period during which they are temporarily stabilized.

The time must come, if the country is ever to cease to fluctuate between periods of feverish and unhealthy prosperity and periods of even more unhealthy depression, when leaders in public affairs and in business will resist the tendency to an excessive expansion of industry and overtrading when that tendency prevails, and toward excessive reductions of production and under-trading when that tendency prevails. There never was or will be a better time to begin offering resistance to excessive reductions of production and buying than the present.

3. Bearing of Transportation Situation Conditions

The existing transportation situation greatly emphasizes the need for such resistance being made. Five years of costly experience have demonstrated that the railways, with their existing facilities, cannot transport all the commodities that the country can produce unless they are given opportunity to transport them in more uniform volume than in former years. A severe and protracted decline of the amount of freight shipped now would inevitably result in seasonal traffic being offered to the railroads all at one time which would be followed by acute traffic congestions and car shortages, and great delays in the handling of a large part of the freight. These things would restrict production after it began to revive and thereby tend to hold up or increase prices and the cost of living, whereas it is desirable that for some years the general tendency of prices and the cost of living should be steadily, but not violently, downward.

The same general effects that will be produced by the failure of shippers to ship now all the freight that they can ship will be produced by failure of the railways to buy now all the equipment and supplies that they are reasonably able to buy. The railways themselves, as purchases of equipment and supplies, are among the largest shippers in the country. Therefore, every unnecessary delay by them in buying will tend to reduce the amount of freight that can be shipped now and to increase the amount of it that must be shipped later. A point of even greater importance is that every unnecessary delay of the railways in buying will restrict the amount they increase their capacity and thereby reduce their ability to handle freight later on. When the next period of heavy traffic comes the railways will be in a very precarious position if they cannot show the public that they have done all they can to prepare for it.

It need hardly be said that the determination of whether those who have freight to ship can and will ship it now, and of whether the railways can and will buy now, is not entirely in the hands of those who have things to ship and of the railways that need to buy. No shipper can ship a thing unless somebody is willing to accept and pay for it, and he must be convinced that the price he can get is reasonable under all the conditions before he will ship it. Likewise, no railway management can be justified in making purchases unless those who have equipment and supplies to sell are willing to sell them at prices which, under all the conditions, the management of the railway is convinced are fairly reasonable. There are great opportunities under present conditions for differences of opinion between buyers and sellers as to whether the prices the former are able to take, and the latter are able to pay, are reasonable; and when these differences of opinion cannot be composed no shipping or buying will be done. But when differences of opinion regarding reasonable prices are very great there is a strong chance that both parties are unreasonable, and that the prices which under the conditions can and ought to be offered and accepted lie between the two extremes.

4. Not Urging What Is Impossible

In agitating the subjects of "Buying Now" and "Shipping Now" the *Railway Age* is not engaged in a quixotic effort to get people to do what it is impossible for them to do. A manufacturer who cannot get merchants to buy his goods cannot ship them. A railway which is trembling on the brink of bankruptcy, or whose ability to buy has been restricted or destroyed because the government is withholding from it money which it would require in order to purchase equipment and supplies in normal amounts, cannot be expected to buy in normal amounts. The slogans of "Ship Now" and "Buy Now" are addressed only to those who really can ship now or buy now, and whose failure to do what they can do now will sooner or later make conditions for everybody concerned worse than they otherwise would be.

There are many business interests that can ship now, and many railways that can buy now; and they should consider very carefully whether, by following a policy of delaying shipping and delaying buying, they will not in the long run lose more than they will gain.

1920 and 1921

THE YEAR 1920 was in many respects the most extraordinary in the history of the railroads of the United States. The total traffic handled, the total earnings made, the operating expenses incurred and the taxes paid were the largest ever known. The total net operating income earned was the smallest ever recorded since records for all the railways were kept. In 1888, the first year for which we have statistics of the Interstate Commerce Commission, the total net operating income was reported as $316,000,000. In 1920 it was only about $150,000,000.

The year in which such an astounding record of earnings and expenses was made could hardly have failed to be remarkable in other respects, and it was. It witnessed the largest single advance in wages ever given to railway employees or to any class of workingmen in the history of the world. It witnessed the largest advances in freight and passenger rates ever made. It saw railway construction decline to 314 miles and the amount of railroad abandoned increase to 713 miles. This was the fifth consecutive year in which the investigations of the *Railway Age* have shown more mileage abandoned than built. Railway affairs have reached such a pass that we now make compilations to find, not how much the mileage has increased, but how much it has diminished. The diminution in 1920 was the greatest that ever occurred.

When conditions get so bad that they can hardly get any worse, hope, "springing eternal in the human breast," leads us to anticipate that they will soon begin to get better. The statistics published elsewhere in this issue indicate that conditions in the railroad industry really have begun to improve. The number of locomotives built for domestic service in 1920 was smaller than in 1919, but the number ordered was nine times larger. The number of freight cars built was not as large as in 1919, but the number ordered was three and one-half times larger. The number of passenger train cars built was almost twice as large as in 1919, and the number ordered four times as large.

There was a marked increase in efficiency of operation, to which was due the fact that a record-breaking traffic was handled. As small as the net operating income was, Dr. Parmelee, Director of the Bureau of Railway Economics, estimates in an article published elsewhere, that if throughout the year 1920 the same wages and rates had been in effect as are now a net operating income of $990,000,000 would have been earned. This would not have been six per cent upon the valuation fixed by the Interstate Commerce Commission, but it would have been five and one-half per cent. Having reached the bottom of the hill the railways before the year closed began to climb upward.

The railways fought and won in 1920 the hardest and most important battle of their lives. They succeeded in getting themselves returned to private operation under unprecedentedly favorable legislation. They secured almost all the advances in rates for which they asked. They began breaking all records for volume of business moved just when their critics commenced to proclaim they were "breaking down."

Hard as was the battle they had to fight and win in 1920, it seems not improbable they will have to fight an even harder one in 1921. They must earn more net operating income under the new rates than they have been earning and they may have to do so in spite of a reduced business for some months. Apparently there is only one way for them adequately to increase net operating income and that is substantially to reduce operating expenses.

It is not difficult temporarily to reduce expenses by slashing right and left regardless of later consequences. But the railways are confronting the probability that within a few months they will have to handle a larger business than ever. If they recklessly reduce expenditures of all kinds now they will later be criticised upon the ground that by doing so they failed to fulfill their obligation to do their best to prepare for handling the country's commerce. On the other hand, if they do not reduce operating expenses as much as is practicable they will not earn sufficient net income to enable them to raise new capital, and if they cannot raise new capital they cannot adequately increase their facilities.

The Greeks talked about people having to avoid Scylla and Charybdis in order to make a successful voyage. A more modern phrase refers to people who are in the predicament of being "between the devil and the deep sea." A still more modern and perhaps more expressive term describes people as being "between hell and high water." Either of these phrases might be aptly used to describe the situation in which the railways find themselves.

The way out seems clear enough, but to follow it will be by no means easy. The railways should effect every economy that is consistent with proceeding as rapidly and as energetically as practicable to putting and keeping their organizations and property in condition to handle a large business. They will be criticised by those who like to criticise them no matter what they do. They always have been, which is a pretty good reason for believing they always will be. For this reason, the railways should use every means available for presenting to regulating bodies, business men and the public the facts regarding what they are doing, how they are doing it, and why they are doing it. Regulating bodies, business men and most of the public wish success for the efforts being made to show that the railways can be operated more economically and can give more and better service under private than government operation, and they will all help if the railways will show they are doing their best. But their help will be needed and they must be "shown."

As 1920 was in many respects the darkest year in railroad history so it is not difficult to conceive that 1921 may be made the most glorious. The railways achieved a great thing when in spite of all difficulties they in 1920 surpassed all previous records in handling freight. The problem of reducing operating expenses needs the same intelligent, concerted, strenuous treatment in 1921 that was given the problem of

breaking the congestion and eliminating the car shortage in 1920. If as much progress is made in reducing expenses, rehabilitating the properties and increasing their capacity in 1921 as was made in other respects in 1920 the fears which still so widely prevail regarding the future of the railways will soon be dispelled.

The Railways and Labor in 1921

FOR THE GOOD OF BOTH the railways and the employees the thing most needed in the railroad field is an increase in the economy and efficiency of operation. The thing most needed to bring this about is an increase in the efficiency of labor. Probably nothing will contribute so much toward increasing the efficiency of labor as a better understanding by the managements and the men of one another's problems and points of view. The best way to bring about a better understanding will be for the officers and representatives of the employees of the various individual railways to get together and frankly talk over their mutual problems. Whether or not national agreements or national boards of adjustment exist under private operation, the efficiency and loyalty of the employees of the individual lines will depend largely upon the fairness and frankness with which the managements deal with them, and frequent conferences between the officers and representatives of the men can hardly fail to beget fairness and frankness on both sides.

"Get together" programs of various kinds are being adopted on different railways, and they seem to promise more satisfactory and beneficent relations in 1921 than have prevailed for some years. The officers and employees of the Missouri, Kansas & Texas recently held their first "staff meeting" under private operation at Dallas, Texas. The meeting was attended by the principal operating officers and officers in some other departments, and by the general chairmen of the committees of the principal labor organizations. Committees composed of both officers and representatives of the employees have been organized to study important problems such as "Shop Efficiency and Welfare Work," "Station Efficiency and Welfare Work," "Roadway Department Efficiency and Welfare Work," etc. The representatives of the employees have expressed their gratification at being invited to attend these meetings and serve on the efficiency committees, and it is believed that the results of the conferences and the work of the committees will be highly beneficial.

In New England the Boston & Maine and its employees have adopted a somewhat similar policy. Officers of the railroad and representatives of the men have been holding meetings, the fundamental purpose of which has been, (a) to discuss grievances not disposed of through conferences between local officers and local committees; and (b) to inform one another of developments arising on either side of mutual interest, and to discuss general questions of operation and policy. By arranging a system of schedules which required that the local officers and representatives of the local organizations should meet regularly, at which all of the matters in dispute would be heard and decision rendered within a specified time, practically all disputes of consequence were soon settled, and the general officers of the railroad and the representatives of the labor organizations were left almost free to discuss general questions of operation and policy.

The men have been encouraged to speak frankly on all matters of interest to them, and the officers have shown no hesitation in expressing their points of view, and out of it all is gradually developing a better understanding of the difficulties encountered by both the management and the men. The men have been fully informed as to the financial condition of the road, and especially of the causes for the present unsatisfactory situation of the New England railroads generally. Both the management and the men recognize the fact that they cannot introduce a millennium in their relations, but they also believe that each side has been and will be benefited by frank conferences, and the results thus far gained support this view.

On the last day of the old year the management of the Pennsylvania Railroad System issued a statement that it had just concluded with the representatives of its engine and train service employees, "a mutual agreement regarding the settlement of future labor differences, which, if lived up to in spirit by both sides, should, in the belief of the management, eliminate any question of strikes on this railroad so far as train operation is concerned." The arrangement is the outcome of a series of meetings. There has been established the "Joint Reviewing Committee of the Pennsylvania Railroad System" for the settlement of all controversial questions affecting the train and engine service men. The committee will be composed on behalf of the management of two representatives of each of the four regions of the system, and on behalf of the employees of the general chairmen of the men in engine and train service. The votes of the representatives of the employees on the committee will be of the same power as those of the officers, and a two-thirds vote will be necessary to decide any question presented. On all matters except individual discipline cases the full committee will vote. The Pennsylvania system, for operating purposes, is divided into four regions. When a discipline case comes before the joint reviewing committee the representatives of the management and of the employees in the region in which the case arises will not sit as members of the committee, but will act as counsel in the presentation of their respective claims, while the remaining members of the committee will hear the case and determine the issue. The work of the joint reviewing committee will be supplemented by monthly conferences between superintendents of the various divisions and representatives of the men, and between the general superintendents of the grand divisions and representatives of the men.

These are but a few examples which might be cited of policies which are being initiated on the railroads for bringing about better understandings and settling controversies while they are in their incipiency and before they reach the stage where they might cause serious trouble. Undoubtedly the year 1921 will see increasing efforts made by the managements and employees of the various railways to come to a better understanding, and more harmonious and efficient working relations established. Nothing could be done which would tend more strongly in the long run to promote the

real interests of both; and the public should regard developments of this kind with great interest and satisfaction because, in the long run, the public will be the chief beneficiary of all policies which tend to make interruptions of transportation less likely, and to promote increases in the efficiency of operation.

The Government Should Pay the Railways

ONE OF THE MAIN REASONS why many railways are not buying the normal amounts of equipment and materials is that the United States government is withholding from them money that they need. Congress did not intend that this should be done, with the resultant injury it causes to business of all kinds.

Congress is in session and can very quickly, by a simple piece of legislation, remedy the situation. Congress ought to do so.

Congress provided, in the Esch-Cummins Act, for loans up to $300,000,000 to be made to the railways on the certification of the Interstate Commerce Commission. The plain purpose was to help the railways get through the period of transition immediately following their return to private operation. The commission acted promptly and in good faith to give effect to the intent of Congress, but the bureaucrats in the United States Treasury Department put so many obstacles in the way that the railways have not succeeded yet in getting all the loans Congress provided for.

To further help the railways get through the period of transition following their return to private operation, Congress provided for the guarantee of their net return from March 1 to September 1. Congress knew a deficit was bound to be incurred. Expenses and taxes were exceeding total earnings when the railways were returned. A large advance in wages was impending. The very fact that Congress guaranteed the net returns of the railways for six months is conclusive evidence that it expected a deficit to be incurred until the Interstate Commerce Commission should grant advances in rates to fulfill the provisions of the act.

Congress provided that payments to the railways on account of the guarantees should be made on the certification of the Interstate Commerce Commission. On September 1 about $400,000,000 of the amount guaranteed remained unpaid. The commission and the railways assumed that this could and would be paid in installments as the guarantees had been previously, but the Treasury Department has held it up on the ground that after September 1 no further installments could lawfully be paid except in complete settlement of claims.

The withholding from the railways of more than $400,000,000 due them has left many of them almost without immediate available financial resources. It is disabling them from going ahead with purchases and improvement and maintenance work that are much needed. It is defeating the plain intent of Congress that the railways should be provided with means of getting through the transition period in a way that would help them and the business of the country. Developments within recent months have made it more necessary than it appeared it would be when the Esch-Cummins Act was passed for the railways to make purchases that would serve as a stabilizing and supporting influence to general business. The withholding of the funds due them is crippling them and helping to slow down business of all kinds when it needs to be stimulated.

Congress can and should speedily pass legislation which will cause the railways promptly to be paid the money which is due them and which they greatly need.

Constructive Work by the Interstate Commerce Commission

ONE OF THE MOST significant and outstanding features of the railway history of 1920 is the constructive work done by the Interstate Commerce Commission. The federal regulatory laws preceding the Transportation Act gave the Commission large powers but did not give it corresponding responsibility for the results of their exercise. The Transportation Act not only gives the Commission greatly increased powers but also new responsibilities. The Commission in 1920 exercised its powers and assumed its responsibilities in a way that deserves high praise and promises well for the future federal regulation of railways.

The Transportation Act gives the Commission new authority for the regulation of operation in times of emergency. A real emergency was created by the conditions resulting from the switchmen's strikes. The Commission, if it had been anxious to do so, could have issued orders regarding the distribution of cars and locomotives and the operation of terminals which would have made it practically the manager of the railroads. It very wisely refrained from doing so and practically told the chief executives of the railroads that it was their job, not that of the Commission, to manage the roads, and that while so far as was necessary it would help them by the exercise of its authority, it would not assume, unless forced to, the responsibility for actually operating the roads. The result was that the Commission issued such orders as were necessary to help the managements, but left to them both the opportunity and duty of actually conducting operation and the outcome fully vindicated the intelligence and self-restraint that it showed.

The Commission might have timidly refused to grant advances in rates anywhere near as large as those that the railways asked for. If it had done this many railway companies speedily would have been bankrupted, private operation would have failed and the Commission would have been mainly to blame. It might, on the other hand, have boldly granted all the advances in rates for which the railways asked. If it had done that the railways would have been able from the start to earn the full return of six per cent

and the Commission might and probably would have been criticised for being too generous with them. The advances in rates actually granted apparently in the long run will be sufficient to enable the railways to earn a return of six per cent and afford a powerful incentive to efficiency and economy, since it has become plain that only under the most efficient and economical operation possible can the required return be earned. It has saved itself from any just criticism for being too generous. It has given the railway managements an incentive to the utmost efforts to operate efficiently, and it is reasonable to assume that if it finds that the rates granted by it are either too low or too high to yield the specified return of six per cent it will in due time adopt corrective measures.

While the committee of state commissioners delegated to sit with the Interstate Commerce Commission in the rate case recommended that the same advances in state rates should be granted as in interstate rates this has not been done in many states. The state commissions are supposed to have great political power. The Interstate Commerce Commission might have timidly refused to exercise the authority granted in the Transportation Act to cause the state rates to be advanced. On the contrary it has courageously rendered decisions which if they are upheld by the courts will force the states to put their rates on the same general basis as the interstate rates.

One of the things most needed to enable private operation to succeed has been closer co-operation between the railways and the shippers. One of the principal reasons why there has not been enough of such co-operation in the past has been that the railways often tried to make important changes in rates, in the privileges granted to shippers, and in service without adequate previous conference with them. The commission repeatedly and in numerous ways has used its great influence to get the railways and shippers to confer and agree about important matters instead of carrying them before it for highly controversial hearings.

The commission has acted in accordance with the spirit of the Transportation Act. The public and Congress having made plain that they prefer private ownership and operation and want them given reasonable opportunity to succeed, the commission has been contributing all it can toward their success. Having in the Transportation Act been given its first opportunity to be really helpful and constructive the commission has been doing all it could to be helpful and constructive.

A Train of 60 Refrigerator Cars on the New York Central

"Ship Now" Section

Why Buyers and Producers Should "Ship Now"

Prospective Coal Traffic in 1921

Large Amounts of Lumber at the Mills

Great Amounts of Grain Still Upon the Farms

Vast Program of Highway Construction

Railway Executives Comment on "Ship Now"

Why It Is Important to "Ship Now," Daniel Willard.

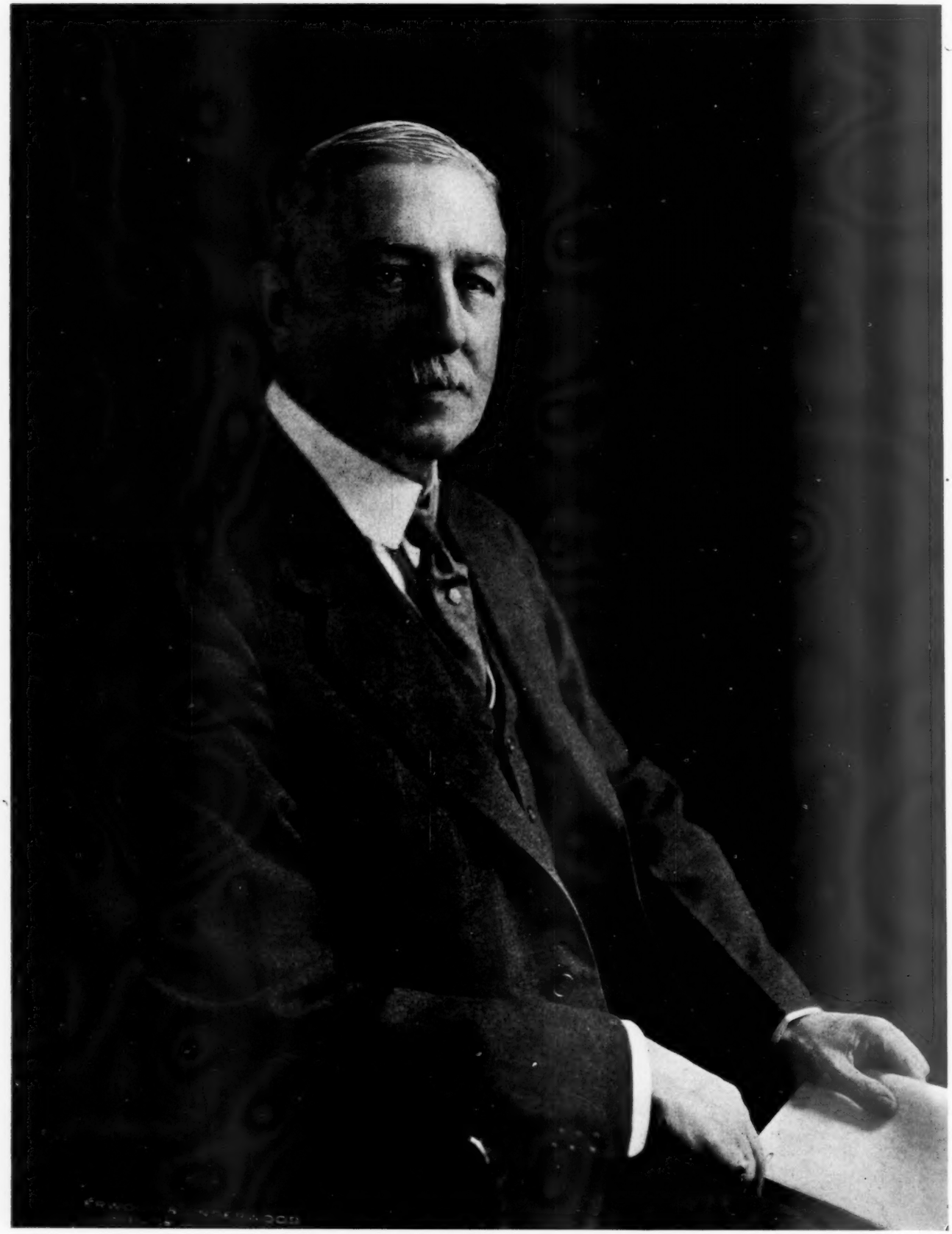
"Ship Early" and Ease the Peak Load, R. H. Aishton.

Future of Railways Depends on Constructive Regulation, J. Kruttschnitt.

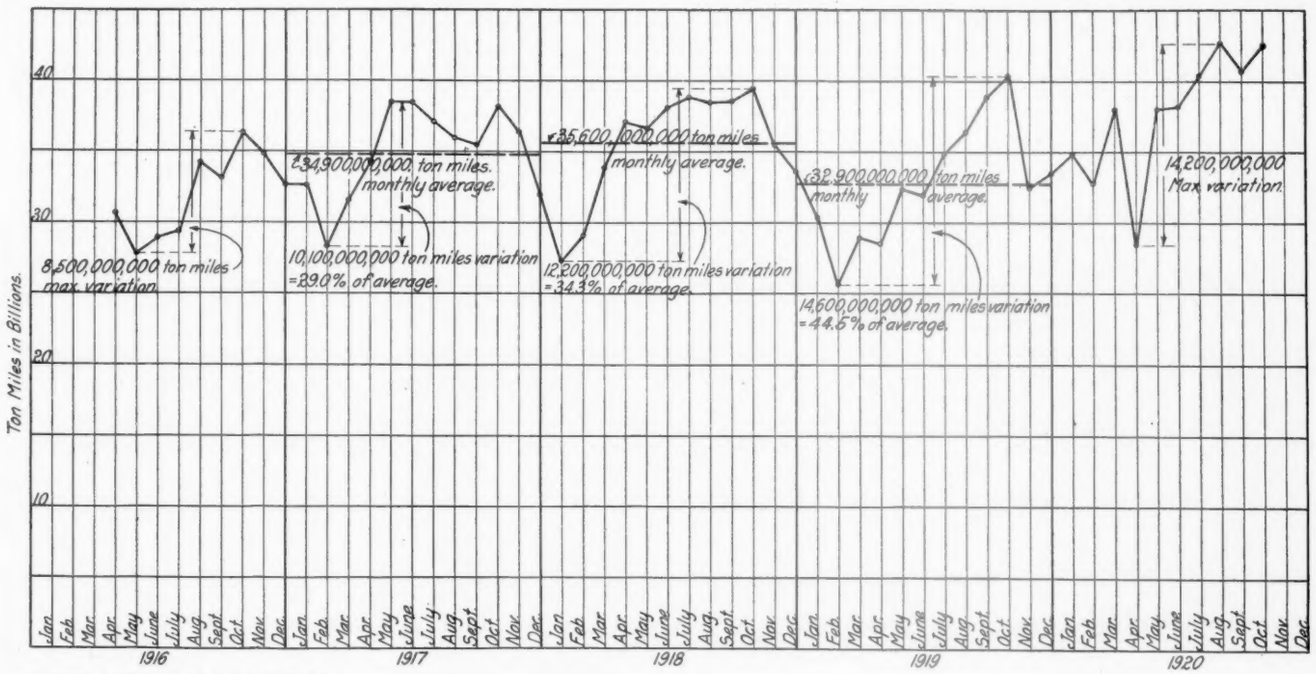
Conditions a Challenge to Resourcefulness of Private Management, C. E. Schaff.

More Freight Should Be Moved in Months of Light Business, L. F. Loree.

Shippers Should Anticipate Their Requirements, C. H. Markham.



THOMAS DE WITT CUYLER
Chairman of the Association of Railway Executives



Fluctuations in Freight by Months

Why Buyers and Producers Should "Ship Now"

Both General and Special Conditions Indicate a Volume of Business which Must Be Given to the Railways in Uniform Amounts to Prevent Serious Trouble

FROM A PURELY transportation standpoint there are several important reasons why it behooves the shippers of the United States who can do so to "ship now." The word "shippers" is used here to designate those who, whether the originators or receivers of freight, can determine whether it will be shipped now or later.

The railways at the present time have surplus transportation capacity. The net surplus of freight cars on the date of the last report, December 15, was 101,472. The actual surplus capacity which the railways had was larger than this figure indicates.

It is practically certain, however, that this surplus capacity will not exist long. It was created by two things, first, an increase in the efficiency of operation, and secondly, a decrease in the amount of traffic offered. It seems certain not to last long because it seems certain that within a few months there will be a large increase in the traffic offered, and that, meantime, the railways will not be able substantially to increase their maximum capacity.

The reasons why it appears certain that within a few months the railways will again have all, and more than all, the traffic they can handle are partly reasons of a general character and partly reasons due to unusual special conditions now existing.

There are certain general causes which always have operated in the past, are operating at present, and will continue to operate in future, constantly to increase freight business. These causes are the normal growth of the country's population, and the normal increase of its production and consumption per capita. Study of the history of the freight traffic of American railways shows that even the most violent panics and the severest industrial depressions result in only very brief and comparatively small declines in the amount of freight offered for movement. The accompanying chart, entitled "Revenue Ton Miles in Billions," shows the fluctuations of traffic from 1901 to 1920.

ALL SHIPPERS who can do so should "Ship Now!" The railways will probably have to handle at least 550,000,000 tons of bituminous coal in 1921.

The total available appropriations for highway construction amount to $1,394,000,000, vastly exceeding all past records.

The amounts of grain still on the farms surpass anything ever known before.

An abnormal amount of lumber is already cut and ready for shipment.

From 1901 to 1907 the traffic handled increased every year. In fact, the increase was continuous from 1894 to 1907. The latter was a "peak" year, and there was a decline in 1908 following the panic of 1907. It is significant, however, that the amount of freight handled in 1908 was larger than in any previous year except 1907. Freight business then began to grow again, and 1910 was another "peak" year. There was a decline in 1911, but the business handled in that year was greater than in any previous year except 1910, and in 1912 it was larger than in 1910. The year 1913 was another "peak" year, but in spite of the depression in 1914 and 1915 in each of these years the freight traffic was greater than in any previous year except 1913.

In 1916, 1917 and 1918 there were further great increases of freight. The slump in 1919 made the total freight handled in that year less than in either 1918 or 1917, but even in 1919 it was greater than in 1916, which, in net earnings, was the banner year of railroad history. In 1920 traffic again exceeded that of any previous year. There was a slump late in 1920, but in spite of it the railways almost down to the end of the year handled more freight than in the same weeks of any previous year.

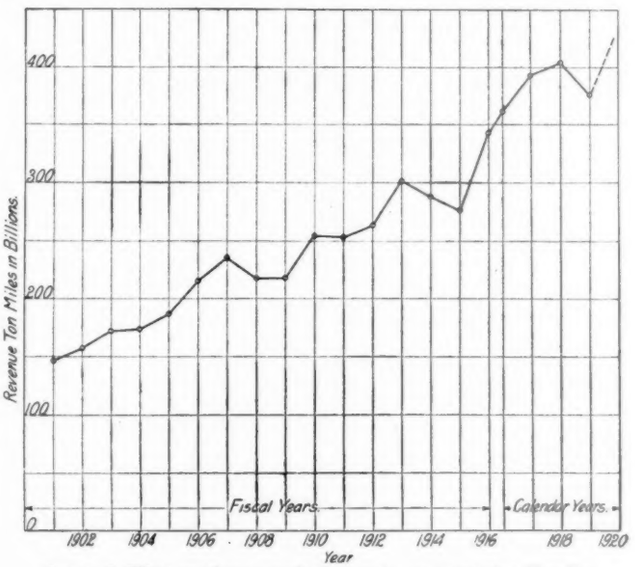
The indications are that the traffic in the early part of 1921 will be lighter than it was in the early part of 1920, but the almost unbroken experience of the last 30 years indicates that the total amount of freight offered to the railways during the entire year will be greater than in any previous year, with the possible exception of 1920.

It would be a safe prediction that this would be the case even though there was nothing to base the prediction on except past experience, but there exist at the present time several special conditions which seem to foreshadow a large freight business.

The sharp decline in general business activity in the latter part of 1920 was largely responsible for the decline in railroad traffic. The general decline in business activity, in turn, was largely due to a "buyers' strike," which was as sudden in its coming as it was violent in its effects. The suddenness with which it came and the extent of its effects are indicated by replies received in response to a questionnaire sent out by The Blackman Company, an advertising agency of New York. This questionnaire was addressed to trade and technical papers devoted to 36 different lines of industrial and mercantile business, including most of the important lines of business in the country. The replies to it showed that there had been a diminution of buying in 30 out of the 36 lines of business surveyed. In 22 of these 30 lines of business the reduction in buying had come suddenly. In some businesses it came several months ago, but in a large majority it began within the last six months, and in most of them in September or later. In none of the industries surveyed in which there had been a reduction of buying had the reduction been less than 10 per cent, in most of them it had been over 50 per cent, and in many of them it had exceeded 75 per cent.

So sudden and drastic a reduction of buying in so many lines of business could hardly fail to be followed in a short time by an increase of buying, and, as a matter of fact, in a large part of all the lines of business surveyed the reductions of prices which had been made had begun to secure responses in increased buying. It seems entirely reasonable to assume that increased purchases in almost all lines of business will be a feature of the spring months of 1921.

Other special conditions of great importance are that there is an abnormal amount of grain upon the farms, that the coal supplies on hand at present are certainly no more than normal, that there is in prospect an unprecedented activity in highway construction, that there is an unusual amount of lumber piled up at the mills ready for shipment, and that there is need for general construction activities to provide buildings for business purposes and homes for people to live in. The country's grain, coal, coke and building materials (including lumber, sand, stone, cement, brick, etc.) normally furnish the railways with over 60 per cent of their total ton-



Annual Fluctuations and Growth of Freight Traffic

nage. It is easy, therefore, to see how a heavy movement of these commodities, which it seems reasonable to expect, will contribute toward making the total traffic large.

Assuming that the railways within the year 1921 will be offered a larger traffic to handle than ever before, except possibly in 1920, what are the prospects that they will be able to handle it? The railways were returned to private operation on March 1, 1920, but what interstate rates they were going to be allowed to charge was not settled until five months later. It was not possible during this time for the companies to make any substantial increase in their facilities. When the earnings produced by the new rates began to be ascertained they were disappointing. There had been increases in operating expenses which had not been contemplated, and many states had failed to make advances in state rates proportionate to those made by the Interstate Commerce Commission in interstate rates. Furthermore, about the end of October there began a decline in traffic and earnings which alarmed railway officials. Besides, the government owed the railways several hundred million dollars and the inability of the companies to get this money reduced their ability to carry on the rehabilitation and expansion of their properties.

Consequently, the railways entered the year 1921 with

practically no more facilities than they had at the beginning of 1920. They have increased their capacity by more efficient operation, and there is no doubt that the amount of traffic that they can handle in any given week or month is larger than it was before. But the experience of the last five years, when the capacity of the railways has been almost constantly unequal to the demands, has shown that if they are to handle in an entire year as large an amount of business as they did in 1920, or even in 1918, the business must be given to them in more uniform amounts from week to week, and month to month, than it was before the war.

The fluctuations in the amount of traffic handled by the railways in different parts of the same year have been much less recently in years when they have handled a large traffic than they have been in years when they have handled a comparatively small traffic. In the year 1915, when the total traffic handled was small, the freight handled in October was 35 per cent greater than in March. Again, in 1919, when the total freight handled was the smallest in any year of the last four, the freight handled in October was 38 per cent greater than in March. These differences represent very wide fluctuations. In 1916, 1917, 1918 and 1920 the railways handled almost every ton of freight they could. In 1916, however, the amount of freight handled in October was only 15 per cent greater than in March, in 1917 only 22 per cent greater, in 1918 only 16½ per cent greater, and in 1920 only 12 per cent greater. The reason why the railways were able to handle, and did handle, so much more business in these years than in 1915 and 1919 was not that they were able to, and did, handle much more in the "peak" months, but that they handled more in the months preceding and following the peaks.

The lesson taught by these facts should not be lost. Experience has indicated that with their existing facilities the railways can move a little more than 1,000,000 carloads of freight a week, or approximately 43,000,000,000 tons one mile a month, and that when they have done this they have about reached the limit. Therefore, if concerns engaged in industry and commerce want them to move in 1921 a traffic as great as that they moved in 1920, or even in 1918, commercial and industrial concerns must endeavor to give the traffic to them in approximately uniform amounts from week to week and month to month. If large amounts of traffic which might be moved in the early part of the year are held back and then thrown upon the railways in unprecedented volume, the railways will simply be unable to handle a large part of it for months afterward.

Prospective Coal Traffic in 1921

THE RAILWAYS during 1920 transported the largest amount of bituminous coal ever handled by them in any calendar year except in 1918. The statistics of the United States Geological Survey regarding the amount of bituminous coal produced and transported up to December 18 of each of the last four years are as follows:

1917	536,288,000 tons	1919	441,592,000 tons
1918	566,349,000 tons	1920	537,555,000 tons

In view of the fact that the amount of coal produced and transported in 1920 was so large, and in view of the further fact that in the latter part of the year there was a decline in general business activity and the weather was mild, the question naturally arises as to how large the railways can reasonably expect the coal traffic in 1921 to be. The correct answer to this question depends, first, upon the supplies of coal now on hand, and, secondly, upon the probable consumption of coal.

Railway officers will have no difficulty in recalling that it required the utmost exertion by the railways to handle the coal actually moved in 1917, which amounted to 551,000,000 tons. In fact, the alleged failure of the railways to handle the coal traffic efficiently and in large enough volume was one of the main reasons for the adoption of government control in 1918. Under government control various extraordinary measures were used to increase the amount of coal transported. The zone system was adopted, cars were pooled and the coal producers were given priority in the use of open top cars.

The result was that the amount of bituminous coal moved was increased about 30,000,000 tons in 1918 as compared with 1917. Toward the end of 1918 there began a decline in general industrial activity owing to the signing of the armistice, and it was estimated that the amount of coal produced in that year exceeded the requirements by 30,000,000 tons—in other words, that the actual requirements of the country were about the same as the amount actually transported in 1917.

Largely owing to the extraordinary reserves accumulated in 1918 and also to the decline in industrial activity, there was a sharp decline in the demand for and production of coal in the early part of 1919. In the first five months of 1919 the production fell 100,000,000 tons below that of the first six months of 1918. Late in the year came the miners' strike, which further reduced production, and the total production of the year was 121,000,000 tons less than in 1918 and 93,000,000 tons less than in 1917.

In the latter part of 1919 there began a great revival of business activity and a corresponding increase in the demand for coal. The country, therefore, entered the year 1920 with a coal shortage. This was increased by the "outlaw" switchmen's strikes. The railways, in spite of the switchmen's strikes and other difficulties, succeeded, as we have seen, in moving as much coal as they did in 1917, but about 30,000,000 tons less than in 1918. It is the opinion of experts that the production and transportation of coal in 1920 made up the deficiency which existed at the beginning of the year, and also provided the average storage stocks of coal. In other words, the country apparently has entered the year 1921 with normal supplies on hand.

There are, however, no abnormally large stocks on hand, as there were at the beginning of 1919. Furthermore, the consuming capacity of the country increases year by year. The country's consuming capacity increases with its productive capacity, and the unprecedentedly large general freight traffic given to the railways in 1920 shows that the country's general industrial capacity is much larger now than it ever was before.

It was only by herculean exertion that the railways were able to handle the coal traffic moved in 1920. Furthermore, there had to be diverted to the coal traffic the use of many thousands of open top cars which, except for the necessary priority orders issued by the Interstate Commerce Commission, would have been used for the handling of highway construction materials and other traffic.

On the whole it seems to be a safe assumption that unless the depression in business throughout 1921 is unprecedentedly acute the amount of coal the country will need and the railways will have to haul will be practically as great as it

was in 1917 and 1920, or approximately 550,000,000 tons. The actual annual production during the past four years exceeded 535,000,000 tons. The year opens with the railways having no larger supply of open top cars than in 1920. There is more construction work in prospect, especially highway construction, than ever before, and this year those engaged in construction activities should not be obliged, as so many of them were last year, to curtail, or actually stop, their work because the cars they need for shipping sand, gravel, cement, etc., must be used to haul coal.

If the railways are to handle even normal quantities of building materials and at the same time transport approximately 550,000,000 tons of coal, it will be necessary for them to move coal in much more nearly uniform volume throughout the year than they have been given opportunity to do within recent years. They cannot, however, transport coal in approximately uniform volume throughout the year unless consumers and dealers will buy it and producers will ship it in practically uniform volume.

The wide fluctuations which have occurred in the past in the production and shipment of coal are strikingly illustrated by the fact that in the first 98 working days of 1919 the average production was only 1,263,000 tons a day, while toward the end of 1920 the railways were moving 2,200,000 tons a day. The latter figure is more than 60 per cent larger than the former. When the railways are moving an average of only 1,260,000 tons of coal daily they have idle many thousands of coal cars and a very large part of their entire physical plant, while when they are moving 2,200,000 tons of coal a day they are being obliged to put forth the utmost efforts to handle coal.

The railways cannot afford to use so large a part of their facilities to handle coal as they were obliged to use during most of 1920, and the country cannot afford to have them do so. The facilities of the railways are at present inadequate to handling all the country's commerce when general business is active, and if they are obliged during part of the year to devote so large a share of their energies and facilities to moving coal as in 1920 they must neglect other traffic.

The only way to prevent the vast fluctuations in coal traffic which within recent years have been such a disturbing and demoralizing influence both to transportation and to general business is, as has been indicated, to get consumers and dealers to buy and producers to ship more uniform amounts throughout the year. The average weekly requirements are between 10,000,000 and 11,000,000 tons, and when shipments fall as low as 8,000,000 or even 7,000,000 tons, the result sooner or later will be transportation troubles and scares about "coal famines."

The work of educating the consumers, dealers and producers of coal to ship in more uniform volume throughout the year probably will be long and difficult, but there should be no delay in beginning it. In the spring of 1919 there seemed to be no occasion for warning coal producers and dealers that they ought to "ship now." Their failure to ship the normal amounts of coal in the early part of that year resulted later, however, in a flood of denunciation of the railways by the coal operators because of the alleged failure of the carriers to perform their duty, and was one of the main contributing causes of the national industrial and financial disaster which was only narrowly averted when the switchmen's strike in 1920 interfered for a few weeks with the normal operation of the railways.

The coal consumers, dealers and producers of the country must be made to understand that with the railways as short of facilities as they are now they cannot handle the country's normal requirements of coal without having the coal given to them for transportation in reasonable volume throughout the year, and that if they do not use cars when they can get them they will not be allowed to monopolize the supply of them at other times when they are as much needed for other kinds of industry as for the coal industry.

The Interstate Commerce Commission said in its annual report:

"To the extent that the emergency in the fuel situation can be traced to the failure of dealers or consumers in regions remote from their sources of supply to purchase or make firm contracts for that supply in season, it is to be hoped that timely and effective action will be taken to prevent recurrence. They can hardly expect that our regulatory powers, which have to do with transportation rather than with distribution of commodities, should be relied upon to relieve them from the consequences of their own inertia, to the inconvenience or detriment of other regions and derangement of the orderly movement of general traffic."

Large Amounts of Lumber at the Mills

IF THE RAILWAYS do not in 1921 have a heavy lumber traffic it will be because dealers do not buy the normal amounts of lumber and not because the lumber mills cannot ship it. The amounts of lumber which have been cut by the mills and piled up by them because they have not received normal orders within recent months are very large. The Bureau of Lumber Economics of the National Lumber Manufacturers' Association gives the information that on October 31, 198 mills in the South had 1,355,236,000 feet of lumber on hand. This was substantially greater than the amount normally on hand and was 200,000,000 to 300,000,000 feet more than the amount on hand at the same time in 1919. Thirty-four mills in the Northwest reported that on October 31 they had on hand 296,586,000 feet of Douglas fir, which was 10 per cent greater than the amount normally on hand.

This accumulation of lumber at the mills was largely due to relatively small orders and shipments in 1920. Statistics are available regarding the amount of lumber cut and shipped in the 50 weeks ending December 11 from the Southern Pine Association, the West Coast Lumbermen's Association, Western Pine Manufacturers' Association, the California Redwood Association, the North Carolina Pine Association and the Northern Hemlock and Hardwood Manufacturers' Association. The total cut by the members of these associations was 10,397,670,836 feet, and the total shipments 9,007,892,616 feet. The orders received amounted to 8,236,107,078 feet. The shipments for all the associations amounted to only 87 per cent of the cut and the orders to only 79 per cent of the cut. It was, of course, owing to this disparity between the cut, the shipments and the orders that so much lumber was accumulated at the mills.

The statistics for the different associations are as follows:

	Cut	Per cent	Shipments	Per cent	Orders	Per cent
Southern Pine Association	4,289,769,417	100	3,903,804,519	91	3,585,547,271	84
West Coast Lumbermen's Association	3,746,602,479	100	3,283,991,469	88	2,876,368,235	77
Western Pine Manufacturers' Assn.	1,152,687,000	100	911,142,000	79	760,350,000	66
California White and Sugar Pine Manufacturers' Assn.	514,808,000	100	304,328,000	59	533,665,000	104
California Redwood Association	296,605,000	100	263,637,000	89	222,345,000	75
North Carolina Pine Association	308,851,940	100	276,249,628	89	203,237,572	66

It will be seen that in only one territory, that of the California White and Sugar Pine Manufacturers' Association,

did the amount of lumber ordered exceed the amount cut, and that in no territory did the amount of lumber actually shipped exceed 91 per cent of the amount cut, and that it ranged as low as 60 per cent of the amount cut.

The total amount cut in the country as a whole was not as large as the average for the last six years, but the orders and shipments were relatively much smaller still. In fact, both orders and shipments were the smallest in 1920 that they were in any of the last five years.

The need for a great increase of housing construction for both business and residential purposes throughout the country is generally recognized. The comparatively small amount of lumber used recently has been due not merely to the high prices of lumber, but to the very high cost of other materials used in housing construction and also to the very high wages of labor in the building trades. Another reason has been the very small amount of building of freight cars and of other work in which lumber is used on railroads.

The prices of lumber have declined considerably from the high levels reached within recent months, and there seems reason to believe that we are approaching the time when there will be a substantial increase in the amount of lumber used both in general construction work and by the railways themselves. In other words, the prospects apparently are for an increase in the amount of lumber shipped. Any increase in the demand will speedily be followed by a proportionate increase in the amount shipped simply because the manufacturers have so much on hand at the present time which is ready for shipment.

There were, however, no significant indications of increasing orders towards the end of the year. On the contrary, in the four weeks ending December 11 shipments were only 88 per cent and orders only 71 per cent of the amount cut. It seems probable from the figures, however, that the stocks in the retail lumber yards of the country must have become relatively quite small and that they will soon have to begin replenishing their supplies, which, of course, would cause an increase in lumber movement.

Great Amounts of Grain Still Upon the Farms

THE STATISTICS regarding the size of the grain crops grown in the United States in the year 1920, and the amount of grain which has been shipped since these crops were produced, have an important bearing upon the question of the amount of traffic which the railways will have to handle in 1921. Many farmers are holding their grain because of the recent sharp declines in prices, but both the limits of the farmers' financial resources and the limits of the facilities for storing grain make it seem certain that they cannot continue long to hold back so large a part of their grain as they have been holding back.

The grain crops grown in 1920 were, in the aggregate, the largest ever produced in this country. They were larger even than those produced in the war years when the farmers were being urged, as a matter of patriotic duty, to produce all the grain they could. The crops of 1918, 1919 and 1920 in bushels were, according to the government's crop reports, as follows:

Kind of grain	1920	1919	1918
Wheat	789,878,000	934,265,000	917,100,000
Corn	3,232,367,000	2,358,509,000	2,582,814,000
Oats	1,524,055,000	1,231,754,000	1,538,359,000
Rye	69,318,000	88,909,000	89,103,000
Barley	202,024,000	161,345,000	256,375,000
Total	5,817,642,000	4,774,782,000	5,383,751,000

Under ordinary conditions the raising of such vast crops would have been followed in the immediately succeeding months by the shipment over the railroads of unprecedented amounts of grain. This, however, was not the case in 1920. It is a remarkable fact that, on the contrary, the amount of grain and grain products shipped by rail in every single week from that ended July 17 to that ended December 11 was smaller than in the corresponding week of 1919, in spite of the fact that the total grain crops raised amounted to over 1,000,000,000 bushels more than in 1919. The total amount of grain shipped in the last two weeks of July, 1919, was 108,660 carloads. The amount shipped in the same two weeks of 1920 was only 72,694 carloads, a decline of almost 36,000 carloads. The number of carloads shipped in the months of August, September, October and November, and the first two weeks in December, in the years 1919 and 1920 were as follows:

	1920	1919
August	158,652	195,937
September	174,828	190,131
October	198,321	213,409
November	139,909	160,461
December (two weeks)	73,929	76,863

The total number of carloads of grain shipped in 1919 in the 21 weeks ending with December 11 was 945,461, while in the same weeks of 1920 it was only 818,333, a decline of 127,128 carloads.

The fact that 1,000,000,000 more bushels of grain were produced in 1920 than in 1919, and that in the 21 weeks when the grain traffic is usually heaviest the amount of grain shipped in 1920 was 127,128 carloads less than in 1919, shows conclusively that there is still on the farms of the country a vastly greater amount of grain than there was a year ago.

It is believed by those who are well informed that the amount of wheat upon the farms is substantially less than a year ago. This is indicated by the fact that in the year ended July 1, 1920, the total exports of wheat were only 122,000,000 bushels, while from July 1 to December 18, 1920, the exports of wheat were about 147,000,000 bushels. On the other hand, the exports of oats have been far smaller than they were last year, while the exports of rye and barley, the other two principal grains exported, have been relatively about the same.

Practically no corn is exported, and most of that which is produced is never shipped at all but consumed upon the farms. But while most of the corn produced is consumed upon the farms, the total amount of it produced is so much larger than the amount of any other kind of grain that the actual amounts of it shipped are very large.

Factors of the situation which have some bearing upon the question of the amount of grain that will be shipped in 1921, are the amounts believed to have been left over from 1919 and the crop prospects for 1921. There is believed to have been an unusual amount of the 1919 crops still on the farms being held for higher prices when the 1920 crops were harvested. As to the prospective crop of 1921, it is stated that the "new winter wheat get-a-way" is the best ever known at this time of year except in December, 1918. With such a vast amount of grain still on the farms, and the winter wheat prospects good, it is difficult to conceive how the total amount of grain that the railways will be asked to transport in 1921 can fail to be very large.

However, whether the roads will be able to furnish sufficient box cars to transport all the grain offered to them undoubtedly will depend upon the way in which the grain traffic comes to them. One of the main reasons why the amount of grain moved in the summer of 1920, when the prices were still high, was so small was that the railways were unable, because of labor and other conditions, to furnish the farmers all the cars for which they asked. It is easy to believe that if the movement of the grain still in

the hands of the farmers is unnecessarily delayed, and there should be an active revival of general business in the spring, the railroads would find it extremely difficult, if not impossible, to furnish the farmers with all the cars for which they would ask.

The farmers are holding back such large amounts of grain because they hope by doing so to get better prices. The recent declines in the prices of grain have been very heavy, and if the farmers could get better average prices by holding the grain than by shipping it in normal, or even more than normal, volume in the early part of 1921, it would be impossible justly to criticise them for holding it. But the farmers, like other business men, should recognize the fact that transportation conditions as well as prices are an important factor in American business at the present time. They might find that in the long run it was more advantageous to ship a large part of their grain when they could get plenty of cars in which to ship it, than to hold it for higher prices and then find, if and when the higher prices came, they could not get enough cars.

Vast Program of Highway Construction

IF THE APPROPRIATIONS which have been made for highway construction are a criterion, the amount of road building in the United States in 1921 will far exceed that ever done in any previous year.

It was estimated that the total appropriations for the construction of highways available in 1920 were about $650,000,000. This was regarded as a very large amount; and it was much larger than was ever available before. It was found impossible to do anywhere near all the road building planned, largely because the threatened coal shortage made it necessary to give priority in the use of open top cars to the transportation of coal. Probably the amount actually spent in 1919 was about $390,000,000. Expenditures for the same purpose in 1918 were $286,000,000, and in 1917, $280,000,000.

The total funds available for highway construction work in 1921 amount to $1,394,000,000, or twice as much as in 1920. This is the estimate given in a recent bulletin of the Associated General Contractors of America, which published the following table entitled "Funds Available for Highway Construction, 1921":

Total federal aid appropriation	$275,000,000
Forest road appropriations	14,000,000
State bond issues	543,000,000
County bond issues	362,000,000
Direct levies and revenue (estimated)	200,000,000
Total	$1,394,000,000
Less total of projects completed or under construction	264,000,000
Available for new construction, 1921	$1,130,000,000

STATE BOND ISSUES

1918 (Partly expended)		Colorado	$5,000,000
Illinois	$60,000,000	Maryland	3,000,000
Pennsylvania	50,000,000	Minnesota	75,000,000
1919 (Partly expended)		W. Virginia	50,000,000
California	40,000,000	Missouri	60,000,000
Oregon	12,500,000	Virginia (Legislature to fix)	50,000,000
Nevada	1,000,000	New Jersey vehicular tunnel	29,000,000
S. Dakota	4,500,000		
Wyoming	2,800,000	Total State Bond issues available for 1921	$543,800,000
Maine	10,000,000		
Michigan	50,000,000		
Utah	4,000,000		
1920 (New appropriations)			
Alabama	25,000,000		
Idaho	2,000,000		
Oregon	10,000,000		

COUNTY BOND ISSUES, 1920

Alabama	$5,000,000	Nevada	1,200,000
Arizona	8,400,000	New Jersey	.....
Arkansas	2,400,000	New Mexico	200,000
California	24,635,000	N. Carolina	13,609,000
Colorado	.....	Oklahoma	1,158,000
Florida	1,515,000	Oregon	9,696,704
Georgia	15,245,000	Pennsylvania	21,337,553
Indiana	7,373,009	Rhode Island	8,500,000
Illinois	8,862,845	S. Dakota	.....
Iowa	18,475,000	Tennessee	7,195,001
Kansas	50,000	Texas	86,023,000
Kentucky	1,700,000	Vermont	2,766,000
Louisiana	5,850,000	Washington	8,225,000
Maine	.....	W. Virginia	7,039,200
Michigan	2,300,000	Wisconsin	36,525,000
Minnesota	12,800,000	Wyoming	2,800,000
Mississippi	15,773,000		
Missouri	13,504,000	Total county bond issues	$361,971,537
Montana	6,383,0..		
Nebraska	3,000,000		

It has been estimated by the Bureau of Public Roads that of the total amount available probably not more than one-half actually will be expended during the coming year. A large portion of the bond issues were approved only recently, and the time necessary to prepare plans and secure approval of the projects will doubtless limit the expenditures.

More significant considerations from the standpoint of the contractors, according to the bulletin of the Associated General Contractors, are certain factors which it mentions, including ability to get labor, materials and transportation service.

It has been estimated that for every mile of highway constructed there must be transported 100 carloads of equipment and materials. Inability to get sufficient transportation has been one of the chief limiting factors affecting road building within recent years. One of the main reasons why the contractors have not been able to get sufficient transportation has been that they have made no special effort to move equipment and materials when adequate means of transportation were available.

100 CARLOADS PER MILE OF HIGHWAY

Recognizing this fact, a movement was started some weeks ago by the Lakewood Engineering Company, of Cleveland, one of the largest construction companies in the country, to get those concerned in construction activities to "ship now." It sent letters to contractors, highway engineers, banks, chambers of commerce, railway officials and others concerned, pointing out that "if road materials are transported and stored during the winter and early spring months, when open top cars are more available than they are during the construction season, the contractors could proceed with considerably less interruption and their working season would be increased accordingly." The Lakewood Engineering Company states that many replies have been received to its letter, and that most of those replying are in accord with the plan suggested and offer help in making it a success.

Several letters tell what already has been done along this line. At Ogden, Utah, materials for 20 miles of road were shipped in the winter of 1919-1920, and the road was completed during the season of 1920 in record time. The State of Delaware has followed this practice for three years. The Board of Freeholders of Passaic County, New Jersey, has acquired a central storage yard for stockpiling road materials this winter. Belleville, Ill., reports that it has already stored cement for next season's work.

Nevertheless, the idea of "shipping early" is apparently new to many, although it was strongly urged last year by several state highway departments, as well as by the United States Bureau of Public Roads.

One question frequently asked about the early transportation and storage of road building materials is how the contractor is to pay for the materials and their transportation. The Lakewood Engineering Company points out that in 27 states, and in the District of Columbia, legislation has made it possible to pay the contractor in full or in part for material when it is delivered. It adds, "In those states where it is not possible for the highway departments to make such

payments it will, of course, be necessary for the contractor to finance the transportation and storage of materials ahead of time. In such instances he will have to arrange with his banker for the needed funds. But even if he does have to borrow the money, there is every reason why he should do so. The interest on the amount required is absolutely insignificant when compared to the sum the contractor will lose if he should have to shut down his job even only a few days because he cannot get regular delivery of materials during the construction season."

Railway Transportation and Highway Construction

In the circular letter from which the foregoing quotations are made the Lakewood Engineering Company commented at length upon the relation of railway transportation to highway construction, and as its comments are those of a concern which is highly experienced in this field, they are given at some length below:

"Road building materials are usually shipped in open top or gondola cars. In the northern states the greatest demand for these cars comes in the summer months, when they are required for handling coal, ore, sand and stone for construction work and road building, etc.

"In a few instances it has been pointed out by railway executives that on their own particular lines this condition does not exist and these cars are more in demand in the fall, winter, and early spring months than during the summer. However, taking the country as a whole, it is a fact that there is generally a shortage of open top equipment in the summer, and a surplus in the winter. One reason for this is because the navigation season on the Great Lakes closes in November for the transportation of coal and ore. Many cars are needed for this service during the summer and early fall.

"At the close of the navigation season these cars are released, and for a short time are busy carrying coal to the local territory, which can be served after the lake trade is taken care of. But this local service is practically at an end by the last of December, when there begins to accumulate a surplus of open top equipment. The transportation of coal slumps off rapidly after this time, as coal contracts are made on April 1, and from January until that time there is only a very small amount of this business for the railroads.

"It has been the general practice to request shipments of road materials during the actual construction season. The result has been that the railroads are always contending with a peak load just at the time the contractor could do his most effective work if he were able to get his materials. The inability of the railroad to furnish the necessary cars very often makes it impossible for the contractor to get well started on his work, with the result that the close of the season finds him with a job which must be carried over until next year.

"On the other hand, if the surplus cars which are available during the winter and spring months could be put at work hauling materials to be stored by the contractor until his season opens, he would be assured of steady work when he did get under way.

"There now seems no possible reason to look forward to lower prices for materials next year. Freight rates have increased, and a larger demand for materials is expected. The demand is increasing in many localities faster than the supply. Freight rates and the law of supply and demand are the two principal factors governing price. Therefore, it does not seem that material prices will go down. Yet even if there were hope for a decline by next season, the extra cost to the contractor buying his materials for winter and spring storage will really be only a small insurance premium guaranteeing that he will not have to close down his work every few days to wait for materials. Such slight extra cost is mighty cheap insurance.

"The banks of the country are more than willing to help. A contractor needing financial assistance to aid him in shipping and storing materials early should not hesitate to go to his banker. Money loaned for this purpose is really backed by the security of the state for which the road is to be built. And what better security could be wanted?

"The difficulty of unloading sand or stone which has frozen in transit is an objection which is frequently raised to the shipment of road materials during the winter months. It is true that these materials may freeze in the cars, but material for road construction is shipped generally only a comparatively short distance, and such freezing will be confined to a thin crust unless the cars are delayed in transit or unloading. The proper unloading equipment will make it possible to get the materials out of the cars in a minimum amount of time, which will prevent it from freezing solid.

"Where material is delayed, and becomes frozen in severe weather, it, of course, will be necessary to employ steam pipes, or to apply heat in some other way to thaw it before it can be handled from the cars. But such procedure is far from impossible.

"In the fall it is not possible to continue actual paving where the subgrade freezes slightly at night. Although the temperature during the day may not be below freezing, the contractor will not be permitted to place concrete. But such weather is ideal for continuing unloading and storing materials for next season's work.

"In some of the northern states, where very severe weather prevails, it would, of course, be necessary to withhold shipments during extremely cold weather, because even though they are transported for only a short distance, they may become frozen solid in a very short time under such conditions.

"However, in such states where these conditions do prevail, it is possible to ship materials at all times except during the dead of winter.

"Many quarries close down during the winter months—therefore, an argument has been made that materials will not be available for winter shipment. So far as we are able to learn, the quarries close down largely because of habit. There has been no active market for them during the winter months. They have preferred to stop their work instead of assuming the burden of stocking their materials until next season. If a market could be assured for the quarries which would absorb their output, there is no reason why they should not operate twelve months out of the year, with the exception of time required to make repairs."

Highway construction on a large scale is new in the United States. It is so new that, owing to the war and general financial conditions within recent years, the railways have not been able to provide sufficient cars to transport all the equipment and materials required to enable contractors to work continuously throughout the construction season if they attempt to ship practically all their equipment and materials in the construction season. The Lakewood Engineering Company, after a long and broad experience in this field, has made clear that it is feasible for contractors to distribute their shipments of equipment and materials more uniformly throughout the year, and that they should "ship now" not merely in the interest of the railways, but in their own interest and that of the public.

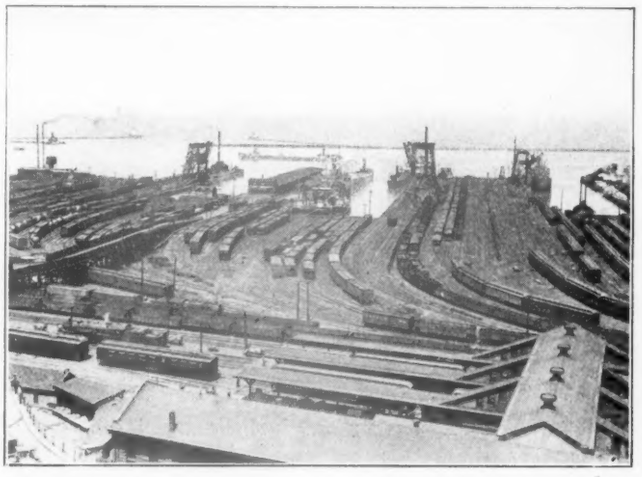


Photo by Ewing Galloway, N. Y.

Piers and Freight Yards at Cleveland, Ohio, with Union Station Train Sheds in Foreground

Redwood Lumber on the Waterfront at Eureka, Cal. Photo by Ewing Galloway

Railway Executives Comment on "Ship Now"

Why It Is Important to "Ship Now"

By Daniel Willard

President, Baltimore & Ohio Railroad;

Chairman of the Advisory Committee of the Association of Railway Executives

WHILE IT IS TRUE that there is a surplus of transportation facilities, particularly box cars and freight locomotives, in the United States today, it does not by any means follow that such will be the case two or three months from now. As a matter of fact, having in mind that a large portion of the wheat crop is still in the interior of the country; that we have raised this year one of the largest corn crops ever raised; and further, that funds have actually been provided for a very substantial program of road-building next year, I repeat, for these reasons and others I cannot help feeling that the transportation facilities of the railroads will be fully used by next spring, say March or April.

In order to avoid possible delays which might be experienced at that time because of the active demand for cars, I think it is highly desirable not only from the standpoint of the railroads but in the public interest, that wherever possible and as much as possible, advantage be taken of the surplus facilities now, to ship in anticipation of the wants later on.

I am inclined to believe that the railroads with their existing facilities could perhaps handle all the business offered during a twelve months' period, providing it were offered uniformly through the entire period, but that of course is exactly what does not happen, and it is certain that the railroads with their present facilities are not able to take care of the possible peak loads, and this is why I think it is wise to urge upon all who can do so to *ship now.*

I think the *Railway Age* is absolutely right in carrying on such a campaign, and I hope it will be successful. As a matter of fact, it has come to me directly that certain large shippers are already acting in accordance with that policy.

"Ship Early" and Ease the Peak Load

By R. H. Aishton

President of the American Railway Association

FOR THE FIRST TIME in five years, on this January 1, 1921, there is a surplus of transportation in the United States, and the transportation machine is not being worked to its capacity. Two things have brought about this condition:

First: The combined co-operative efforts of the railway staffs, shippers and public bodies whereby the average car loading has increased from 28.3 tons in February, 1920, to 30.0 tons in November, 1920, and average miles per car per day have increased from 22.0 in February, 1920, to 28.0 in November, 1920, the net practical results attained automatically approximately adding 500,000 cars to the equipment without any additional capital investment.

Second: Shipments have decreased through the shutdown or curtailment of industry; uncertainty of commodity prices has restricted buying; credit conditions have restricted building operations; the situation regarding foreign exchange and the inability of foreign nations to finance purchases have reduced exports, all bringing about a lessened demand for transportation.

As a result, on the one hand of the improved efficiency of the railroads in handling the freight offered, and on the other of the decrease in the volume of business demanding transportation, there is for the first time in years, except for a short time in 1919, a surplus of cars and locomotives above requirements and not actively working to their capacity. This condition is not without precedent, although seldom, if ever, has the transition from insufficient transportation to a surplus of that commodity come as suddenly and violently as in the past few months and as the decline was sudden,

violent and deep, so may we, if past history is any indication, predict a rebound of the same character.

Never before has the interest of the shipper, the public as represented by the Interstate Commerce Commission and the railroads and their owners and officers been so mutual as now. What can be done to meet this future revival of business in addition to what is now being done in a large degree by the railroads in providing additional locomotives, cars and facilities under a most burdensome financial situation, which program will no doubt be augmented with an easier money situation?

With the knowledge born of past experience that the volume of transportation business is a series of peak loads and valleys of depression, and that every peak is higher than the preceding one and every valley of a higher elevation than the one before it, and that the constant trend is upward, it would seem that all interests, those serving the public and those serving the railroads, might with mutual advantage study practical methods of meeting the increased volume of business so sure to come, possibly in a few weeks, certainly before many months.

Regardless of the present car surplus, a decision to:

(1) "Keeping up the habit" of capacity carloading and capacity car mileage during this period of transportation surplus, would be of inestimable advantage when the days of car shortage come again. A habit once formed is not easily gotten away from.

(2) A decision to "Ship Early" would tremendously help the situation and ease off the peak load. There is a great housing shortage, both for business and homes. Is it not fair to assume that one of the first upward moves will be in building construction? Clearly, if every activity in this direction were to start May 1, there would be a tremendous load on the railroads and inability to meet this sudden load would be unfortunate and affect the public interest in many directions. Can we not anticipate that this may occur and would it not be wise to commence transporting, and if necessary storing even at the cost of re-handling, some of the many materials entering into projects already determined on, in order that there may be no delay due to transportation?

We may definitely assume a large program of highway building and improvement will be started. "Ship Early" would insure an absence of trnsportation difficulties, such as occurred last winter. In a large part of the United States material can be handled during winter months when there is a surplus of cars as easily as in midsummer, and even where there is severe winter weather a portion of the materials can be transported and handled without great additional expense.

Why not "Ship Early" the thousands of carloads of fertilizer in the winter instead of in the spring when they are required on the farms, and avoid the uncertainties of delays due to an overburdened transportation machine?

Why not "Ship Early" such materials as are required for the maintenance programs of railroads, instead of adding this burden to the heavy load later on?

Might we not profitably have confidence in the future, and having that confidence in this time of depression put the transportation facilities to the utmost possible use in providing against the day of Opportunity?

Future of Railways Depends on Constructive Regulation

By J. Kruttschnitt

Chairman of the Southern Pacific Company

WHAT ENLARGEMENT of facilities *should* the railroads make?

The average annual capital expenditure for the construction of new and the betterment of existing lines for the ten years preceding 1917 was about $660,000,000, but as the purchasing power of the dollar has declined, at least twice this amount, or $1,320,000,000 per annum, will be needed to provide what the smaller sum did formerly. In the years 1918-1919 under government control $806,000,000 only was spent (Annual Report of the Director General of Railroads for 1919). As the normal expenditures for the two years should have been $2,640,000,000, capital expenditures were short $1,834,000,000 on January 1, 1920, and this amount, in addition to the normal annual sum of $1,320,000,000, should be spent in 1920 to catch up, and $1,320,000,000 should be spent annually thereafter, subject, of course, to reduction ratably with any rise in the purchasing power of the dollar and in the efficient use of existing facilities.

2. What enlargement of facilities the railroads will *be able to make* in coming years will depend on the extent to which the Transportation Act—passed by Congress after five and one-half years of close study, the greatest (and the only) piece of constructive legislation of the kind ever enacted in this country—will be allowed to work without radical change. It has been in more or less complete operation just ten months—much too short a time to test its merits, when we consider that during this period the railroads have been handicapped by abnormal economic conditions, by shortage of equipment and other facilities and by the disorganization and depletion of their forces following 26 months of government operation. Demands of substantially all classes of employees for increased wages, which long before should have been answered, remained unsettled by the outgoing Railroad Administration, which by procrastination evaded and shifted responsibility to the incoming owners of railroads. This long strain on the patience of the employees caused the so-called "outlaw strikes" of April, 1920, and the worst congestion of railroad traffic ever known.

With motive power and equipment returned by the government in deplorable condition and large numbers of employees disloyal and deserting, traffic conditions were hardly restored to normal before the end of August, when the wage award, quickly followed by the grant of increased rates, was made. The higher rates have been in force but 17 weeks, during six of which the volume of freight traffic has rapidly fallen; and the refusal of a number of state commissions to harmonize state rates with those prescribed by the Interstate Commerce Commission has deprived the carriers of much necessary revenue. We advert to these facts in order to appreciate that conditions prevailing since the Transportation Act took effect have been such as to make it impossible to form a clear opinion of the changes it will produce in the destinies of the railroads.

The Act unmistakably recognizes the duty of the government in its regulation of interstate commerce *to foster and protect* its instrumentalities and to substitute a *constructive* for a *repressive* policy, under which rates had been kept down to low levels and severe punitive measures had been enforced against the carriers.

The two cardinal and controlling features of the Act are: The continuance of private ownership and operation as a national policy, and, the recognition of public interest and public duty in respect to the adequacy and efficiency of transportation facilities.

To make this policy a success requires the sympathy and co-operation of the Interstate Commerce Commission in in-

terpreting and administering the law, and of the carriers and the public in loyally obeying it. The reduction of the outlaw strike congestion, which was accomplished by the efforts of these three agencies, affords convincing proof of the compelling force of united effort. At least several years of uninterrupted operation of the Transportation Act without interference and under normal conditions of traffic, interest rates, and commodity and labor costs will be necessary to develop its effect on the future of our transportation systems, and it is of vital importance that such free opportunity be afforded.

It is not reassuring, however, to know that amendments that go far towards nullifying it have already been suggested. The most important is the proposal to make consolidations compulsory, presumably following the plan that Senator Cummins proposed in January, 1920, whose main features are grouping of the railroads into systems, each one to be operated by a corporation with a federal charter; the grouping into systems to be brought about by forced sale in condemnation proceedings after a period of seven years, within which voluntary consolidation in harmony with a pre-approved plan is permitted. Hence practically all existing railroads for seven or more years will have to live in apprehension, uncertainty and confusion that will be fatal alike to railroad development and to successful operation and maintenance of the properties.

The effect of such legislation—tantamount to government ownership—upon existing systems would be revolutionary, and the mere threat of it makes the future of the railroads so dark and uncertain as to perpetuate the injury to their credit and destroy the stabilizing effect of the Act of 1920.

Another measure before Congress is to change the federal valuation act unfavorably to the railroads. A fair valuation of the railroads is necessary to accomplish the purposes of the Transportation Act, for its principal provisions are based on such a valuation. If the federal valuation act is to be tinkered with and amended to the prejudice of the railroads, confidence in their future will be to the same extent destroyed.

Another proposed amendment is to change the present provisions of the long-and-short haul clause so as to absolutely forbid any greater charge for a longer than for a shorter haul. The passage of such legislation will very seriously affect the earnings of many large systems of railroads, and the threat of such legislation will also create a lack of confidence in the earning power of the railroads likely to be affected thereby.

Again, there is the anti-strike amendment. One of the objects of the Transportation Act was to provide a method of settling labor controversies and avoiding the serious consequences of an enduring test between the railroads and their employees. Before legislation having this end in view has had time to function, an amendment is proposed the practical effect of which will be, in all likelihood, the bringing about immediately a life and death fight between the carriers and organized labor.

It cannot be too earnestly asserted that a feeling of confidence in the permanence of a constructive fostering policy is absolutely necessary for railroad development and prosperity. Such improvements as the Pennsylvania and New York Central stations in New York were planned years before they were made public, otherwise the provident acquisition of real estate would have been impossible. Without such confidence initiative will be destroyed; no corporation will dare to assume the risk of making plans the completion of which may at any time be halted with irremediable loss.

From the above will be seen how impossible is an answer to the second question as to the ability of the railroads to enlarge their facilities. They will no doubt muddle along until Congress by its treatment of proposed destructive amendments inspires investors with confidence that the Transportation Act that it has created is not to be rendered impotent before it has had the opportunity to prove its value.

Conditions a Challenge to Resourcefulness of Private Management

By C. E. Schaff

Receiver, Missouri, Kansas & Texas

THE DECLINE in traffic which marked the closing weeks of 1920 complicates the task confronting the railroads in 1921. While it may slow up railroad recovery, it should not be suspended.

Unfortunately, the decline in traffic followed so closely on the heels of the rate advances, that the railroads cannot immediately get the benefit of the increased net revenue which was anticipated. Revenue calculations of the Interstate Commerce Commission, as reflected in the rates established under the Transportation Act, were predicated upon expectation of traffic in undiminished volume. We are again in a situation not unfamiliar to railroads. Our rates have been adjusted to meet one set of conditions, and an entirely different set of conditions has devoloped before we were well settled under the new rates.

In the face of these circumstances, it should not be discouraging if the railroads fail to maintain the rate of progress toward complete readjustment that was established, following the passage of the Transportation Act and the return to private operation under a sound federal policy.

Despite the difficult conditions which interefered with efficient operation in the months immediately following the return to private operation, the railroads handled a record-breaking tonnage in 1920. Service was everywhere improved. Accumulations of traffic were cleared up. Equipment conditions were made better and the close of the year found the railroads prepared to carry an increased traffic load. Developments generally had indicated the soundness of prophecies that resumption of private operation was the first step toward restoration of railroad efficiency. Indeed, progress had been so rapid as to discount the predictions made freely a year ago that it would require from three to five years to restore the railroads to pre-war efficiency.

The immediate task of the railroads is to counter-balance, so far as possible, through increased efficiency and decreased operating costs, the adverse effect of the decline in traffic on net revenues. The success we shall have in showing encouraging net revenues in the face of decreased business will, of course, regulate our rate of progress in carrying forward the improvement programs which experience has demonstrated are essential to equip the railroads to handle traffic satisfactorily, when business is again moving in what we should consider normal volume.

These conditions are a challenge to the initiative and resourcefulness of private management. They are difficult, but encouragement is found in the fact that the traffic decline itself is influencing our movement toward a readjustment under which operating costs should be relatively lower.

The response of the railroads to the federal policy adopted early last year, has been distinctly encouraging. With the 1921 task satisfactorily discharged, private ownership and operation will have met an acid test.

More Freight Should Be Moved in Months of Light Business

By L. F. Loree,
President, Delaware & Hudson Company

I THINK THE RAILROADS have shown very conclusively that they have the equipment and facilities necessary to handle a business about 15 per cent larger than the movement of October and November, 1920. The results realized from the effort to increase car loading and car movement are very gratifying, but there is still considerable margin for further accomplishment, especially in the car movement. To accomplish this some very bad practices of the railroads and some equally bad practices of the shippers should receive serious attention; and a systematic and determined effort should be made to improve the terminal facilities and the road facilities affecting the movement, especially the former.

A review of the car surpluses and unfilled car requisitions running back to 1907 shows the seasonal character of the railroad business and the very heavy burden thrown on the roads by the movement in October, November and December, and, equally, the very light movement offering in April, May and June. To the extent that the shipper can move his freight in these months of light business, he can reckon on prompt handling and avoid the delays which may embarrass him in the months of heavy business.

However, the indications all are that the business offering in the Fall months of 1921 can be easily handled. Is it then wise to encourage an abnormal movement in months when weather conditions and short days make the work expensive rather than let it take its normal course and move it when conditions are more favorable and the work is relatively economical?

I am afraid the *Railway Age's* campaign is too like the "sunshine campaign" of 1908 and can serve no useful purpose.

Shippers Should Anticipate Their Requirements

By C. H. Markham
President of the Illinois Central Railroad

THERE IS EVERY REASON to believe that the spring will bring a heavy revival of business, following the winter's slump. Railway men are concerning themselves over what effect this commercial revival, if it materializes, will have upon the transportation machinery of the country.

The railways performed a miraculous feat in their endeavors to meet the 1920 demands for transportation, handling an increasing volume of business very largely through the adoption of more efficient and co-operative methods. This performance was made in the face of heavy obstacles which are not likely to face the railways next spring—labor difficulties, disorganized forces, highly deteriorated equipment, inadequate rates and a coal shortage. Therefore, it may be safely predicted that the railways will be able to handle even more business in 1921 than they did during 1920.

It is yet too early to predict with any degree of certainty how great the burden of traffic of 1921 will be, and it is therefore well that those having traffic to offer should realize that the railways are now in a position to handle more traffic than is being offered, and that this position may be changed. By realizing that, and anticipating their transportation requirements as far ahead as possible, shippers may be able, not only to assist in relieving general conditions, but to move shipments which might be tied up, should a paralysis of traffic occur.

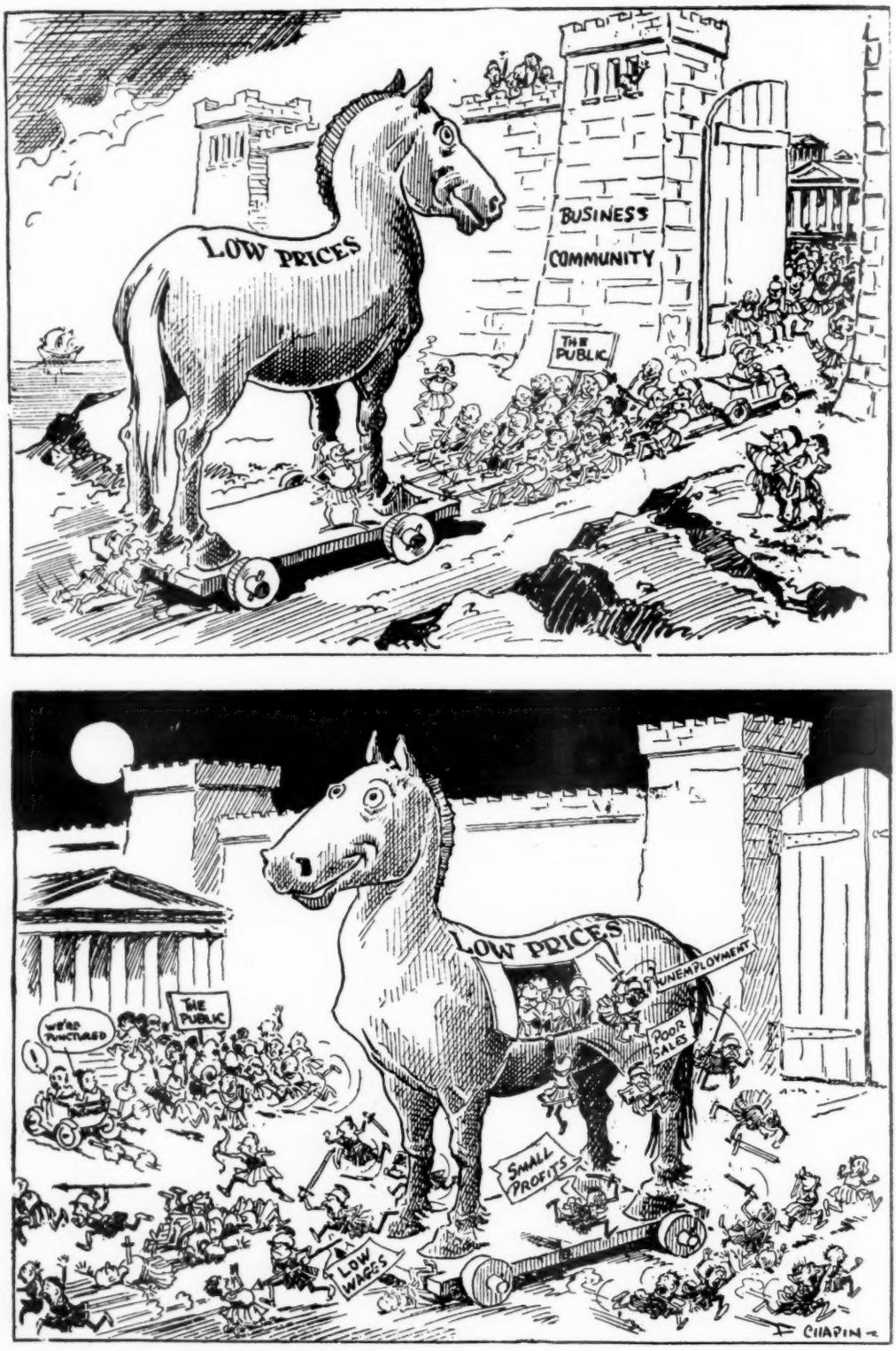
In this connection, it should be noted that large road-building programs are being considered in a number of states. In the majority of cases the state money for the purchasing of road-building materials is now available. There are certain classes of material which can be transported at this time, in preparation for the spring business revival, for instance, sand, gravel, cement, etc.

Retail lumber yards are being rapidly emptied of supplies, without adequate replenishment. The spring business revival should bring a demand for the resumption of building programs, which, in turn, will demand a heavy lumber traffic. Such traffic in that line as can be moved now, should be moved.

There are other instances of this kind. Every shipper would do well to make a study of his needs for the coming year, and arrange his transportation demands in such a way that the movement will be facilitated. He will profit by knowing that his demands have been handled, and are out of the way. Business in general will profit by the relief which it will mean in the spring movement. The railways will profit by having transportation demands more evenly distributed.

Photo by International

Unloading Boilers of American Locomotives at Danzig, Poland



Chapin in America at Work

The Trojan Horse

"Buy Now" Section

Why "Buy Now" Program by the Railways Is Needed.

"Buy Now" as Viewed by the Railway Supply Interests.

The Public Demands Better Service, W. W. Salmon.

Why the Railroads Should Buy Now, A. L. Humphrey.

Railways Should Buy Only to Meet Pressing Needs, Samuel M. Vauclain.

More Uniform Buying Would Cause Lower Prices, Charles J. Symington.

Uncertainties of Situation Militate Against Buying, R. P. Lamont.

An Opportunity to Prepare for Greater Economy and Efficiency, Stanley H. Bullard.

Railway Buying and General Business, E. B. Leigh.

Railroad Power of Rehabilitation Returning.

The Next Step Toward Preventing Depressions.

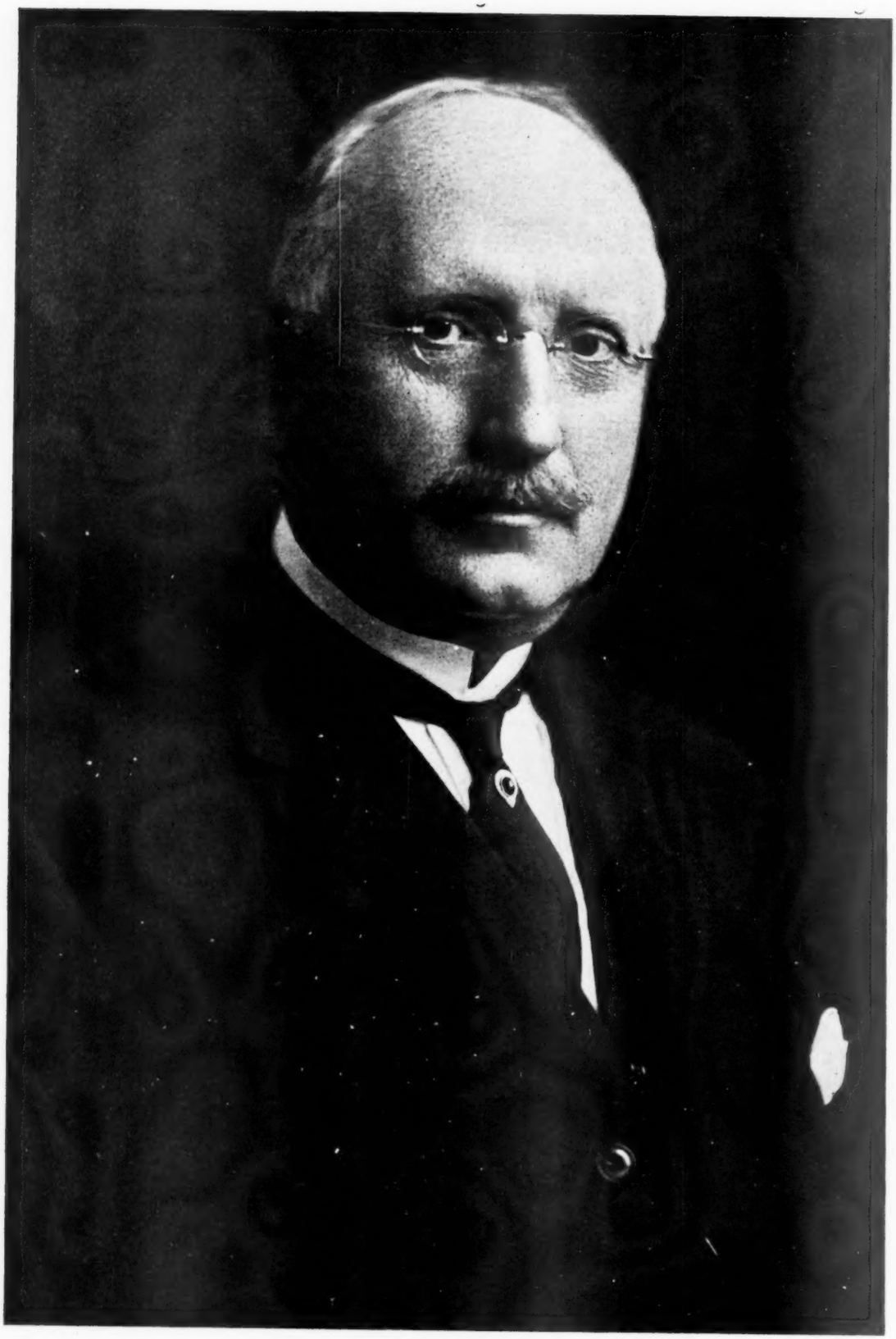
What Additions to Physical Property Are Necessary?

How the Need for More Motive Power Will Be Met.

Little Progress in Reducing Equipment Shortage.

Repair Shop and Enginehouse Equipment Needs.

Attitude of Investors Toward Railroad Securities.



ALBA B. JOHNSON
President of the Railway Business Association

The De Witt Yards of the New York Central, Near Syracuse, N. Y.

Why "Buy Now" Program by Railways Is Needed

Many Factors in Problem Which Those Controlling Purchases Must Consider—"Buying Now" Would in Long Run Help Railways and General Business

THE RAILWAY EXECUTIVE who is considering the problem of the extent of the purchases his railway can make now, and of the extent to which it ought to make purchases now, has to take into consideration many factors.

Many railway companies are so short of funds and have such poor prospects of satisfactory earnings that they really cannot do otherwise under present conditions than carry on a hand to mouth existence. Many others cannot under present conditions raise money for capital expenditures but have sufficient funds available from earnings with which to buy the equipment and materials they require to make immediately needed improvements and to do adequate maintenance work. Some railways, even under present conditions, not only have sufficient earnings to make immediately needed improvements and adequately maintain their properties, but have good enough credit to raise capital in relatively as large amounts and on as easy terms as it can be raised by any industrial, commercial or financial concerns.

Even railways with the best credit hesitate at present, however, to issue securities in large amounts to raise new capital because hardly any railroad can sell stock, and the high rates of interest which must be paid on bonds will impose a heavy burden of fixed charges for years to come.

> "RAILWAYS MUST consider the effect which a drastic curtailment of their purchases at present will have upon their immediate ability to maintain and increase the capacity of their plants, and ultimately to handle the traffic offered to them. If later on there are acute congestions and serious car shortages and it can be shown that they have not done all they reasonably could to prepare for handling a large business, they will be subjected to severe criticisms."

Practically all railroads are handicapped in making purchases by the fact that the government owes the companies in the aggregate about $400,000,000 of the deficit incurred during the guarantee period from March 1 to September 1. The inability of many companies to get their share of this money from the government is one of the principal reasons why they are restricting their purchases as much as possible. Many of them are so short of funds that if they made large purchases now the equipment and supply companies filling their orders would have to give them credit for practically the entire amounts purchased. There is a case on the way to the Supreme Court and also legislation pending in Congress, the outcome of either of which may soon release to the railways a large part of the funds the government is now withholding.

Another reason why many railways which are in an entirely sound condition financially are restricting their purchases is that their earnings under the new freight and passenger rates are disappointing, and that their business recently has been declining. Before deciding on their future

programs they want to see the earnings for a few more months and to get a better idea of how great and how long the decline in traffic is going to be.

Undoubtedly, however, one of the principal reasons why many railways are not buying on a much larger scale than they are buying is that they believe the prices of equipment and supplies should be and will be reduced more than they have been, and are waiting for them to decline further.

There is published elsewhere in this issue in different articles a large amount of data regarding the tendencies of prices of railway equipment and materials from pre-war days down to the present time. The figures regarding the prices of locomotives, freight cars and passenger cars show that they reached their maximum in the first six months of 1920. Comparing with the average for the years 1910-1914, the cost of locomotives in the first six months of 1920 had advanced 151 per cent, of freight cars over 200 per cent and of passenger train cars over 100 per cent. There have been some reductions since these maximum figures were reached, but there is an unmistakable sentiment among many railway officers who control purchases that further reductions must be made before they will be justified in placing orders on even as large a scale as their present financial resources will permit.

The reductions in the prices of some other things the railways buy in large volume have been greater. The prices of open hearth steel rails, which in 1918 was from $57 to $65, is now fixed by the United States Steel Corporation at $47. Track spikes, which sold as high as 5.25 cents and even 7 cents in 1917, are now 3.65 cents. Steel plates for bridges and cars which were 8 cents in September, 1917, and 4 cents in April, 1920, are now 2.65 cents. Pig iron, which was $50 in July, 1917, and $51 in September, 1920, is $33. These are not the prices quoted by all manufacturers, but are the ruling prices. None of them is anywhere near as low as prices in pre-war days, but the declines have been relatively greater than those in the prices of equipment and specialties.

The railways have to consider purchases from the standpoint, not only of their financial resources, but also from that of economy, because the Transportation Act provides not merely that they shall be allowed to earn a net return sufficient to enable them to develop their facilities, but that they shall be allowed to earn this return if they are efficiently and economically operated. Therefore, altogether aside from the matter of their immediate financial resources, they cannot from the standpoint of public regulation and public opinion disregard the necessity of reasonable economy.

On the other hand, the railways cannot afford, in considering the question of purchases, to disregard the effect which the policy adopted by them may have upon their own traffic or their ability to render service. Directly and indirectly they are among the largest shippers in the country. Their purchases not only cause the movement of the finished products they buy, but of the fuel and raw materials that enter into their manufacture. Therefore, other things being equal, the more the railways curtail their purchases now the more they will reduce their own traffic and earnings at a time when they have surplus transportation capacity. Furthermore, the less they buy now the more they will have to buy later on, and the more they buy later on the more they will increase the traffic that they will have to handle when the movement of freight traffic in general has revived. Therefore, for the railways the arguments for "shipping now" are as pertinent as for any other class of shippers.

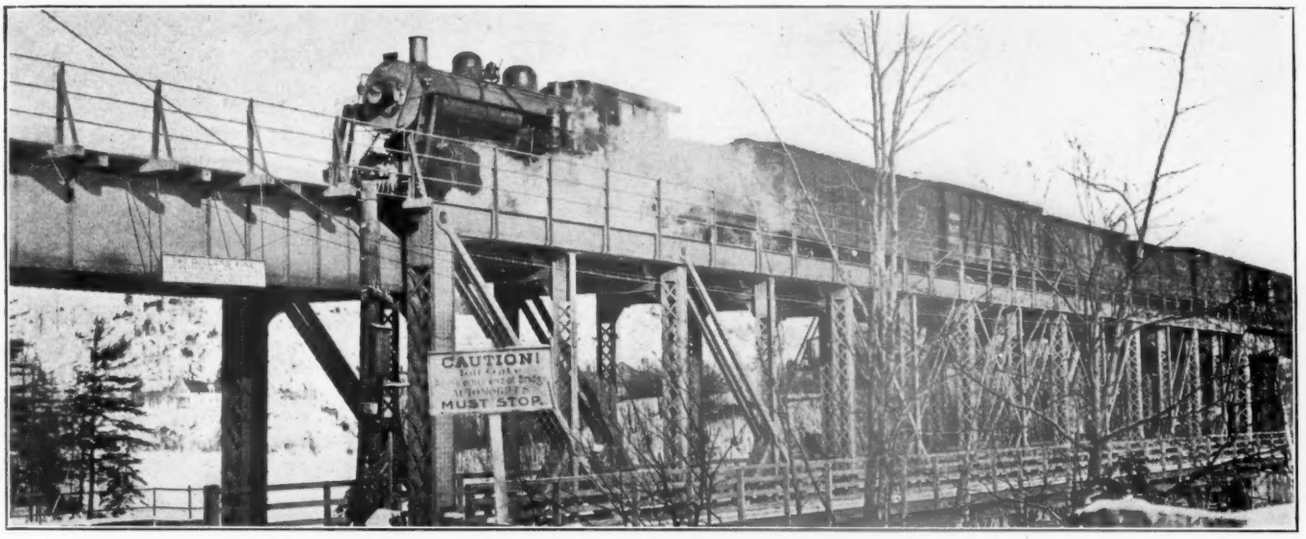
The railways must also consider the effect which a drastic curtailment of their purchases at present will have upon their immediate ability to maintain and increase the capacity of their plants, and ultimately to handle the traffic offered to them. If later on there are acute congestions and serious car shortages and it can be shown that they have not done all they reasonably could to prepare for handling a large business, they will be subjected to severe criticisms which will be difficult to answer.

Reverting to the question of prices, this is one for adjustment between the railways and the equipment and supply companies. All arguments in support of the view that the railways should "buy now" in order to stabilize conditions and prepare for the handling of a large business in future are equally potent in support of the view that the equipment and material companies should do all they reasonably can to make it feasible and desirable for railways to "buy now."

When the buyer and seller cannot agree on prices there is no buying or selling. More uniform purchasing by the railways from month to month and year to year is as desirable from the standpoint of the equipment and material manufacturers as from the standpoint of the railways, but it is evident they must get closer together in their views regarding prices before the process of stabilization of railway purchases can actually be begun.

There can be no doubt that the past policy of the railways has been too largely that of buying in large amounts when general business has been active and prices have been high and of buying in too small amounts when general business has been inactive and prices have been relatively low. It is estimated that at the present time the mills of the independent steel companies on the average are not working to much more than one-fourth of their capacity. The plants of most of the railway equipment and material manufacturers are in somewhat the same general plight. The lumber mills, of whose product the railways are large purchasers, have unusually large quantities of lumber on hand and are operating much below their capacity. Certainly, it does seem that these general conditions afford a good opportunity for the railways and the manufacturers soon to get together on a basis of prices that will justify the railways in beginning to make purchases in as large amounts as the financial resources and prospects of the various railway companies will permit.

There is a good deal of reason for believing that many of the prices now being quoted by equipment and material companies are not the lowest at which they are really willing to make contracts, but are offered as a basis for negotiation, and that lower prices would in many cases be made if it were established with reasonable certainty that large sales actually could be made at these lower prices. Any business concern has a natural reluctance to making reductions in prices when it fears that the effect will be that it will fill only the small orders it is receiving currently at these reduced prices and not get large orders at the reduced prices. There is a great difference, as every fisherman knows, between a mere "nibble" and a real "bite."



"Buy Now" as Viewed by Railway Supply Interests

The Public Demands Better Service

By W. W. Salmon

President, General Railway Signal Company

SHIPPERS, travelers, merchants, and, in general, the people of the United States who are paying an unprecedentedly high price for transport by rail, expect a good deal better service from the railways than many of them think they are getting.

Any prolonged continuance of failure to get an improved service and equipment of the kind and in the quantity required for the economical conduct of their business will lead to general, grave dissatisfaction and may create an item of bad will on the part of the public that will prove costly to the railway owners.

While it may be possible that by waiting, the railways may make certain purchases at a somewhat lower cost than if they purchase now, and that money may be cheaper then than now, delay on these accounts in the making of purchases essential to meeting the reasonable requirements of the public will prove, in the long run, to be a "penny wise, pound foolish" policy.

Having for some years devoted a large part of my time to trying to aid in bringing about more liberal and fairer treatment of the railways and having had opportunity to observe how difficult it has been to get the various trade associations of the United States to advocate and approve legislation designed to enable the railways to put themselves in position profitably and adequately to serve the public, I would greatly regret any action or inaction on the part of the railways that would result in the creation of new hostile sentiment toward them.

Why the Railroads Should Buy Now

By A. L. Humphrey

President, Westinghouse Air Brake Company

ONE EVIL from which the railway supply business suffers more than any other is the unfortunate fluctuations in output of most of the principal railway supply plants, which is generally referred to as the feast and famine condition of their order books. This is largely brought about by the fact that the railroads generally regulate their purchases in some direct relation to traffic conditions existing and set aside only such percentage of their gross income as can be spared over and above a certain amount of their daily average income.

When earnings fall off, orders are usually issued to curtail expenditures of all kinds, and especially the purchase of outside material. When earnings begin to increase, the lid is lifted slightly and requisitions are again placed for needed material, some of which should have been on hand for actual requirements during the dull period.

Anyone familiar with manufacturing conditions must appreciate the fact that this same feast and famine condition is, above all others, the one that militates most against the securing of the thing the railroads are so strenuously contending for at the present time, namely, lower prices. A full order book one month and an empty shop the next month are incompatible with low prices.

If the output of a plant falls below a certain minimum, then the overhead expense is immediately such that, to recoup the loss, prices must be increased rather than lowered, as would be expected on a declining market, and if it is not possible at the moment to secure increased prices

in the long run, the purchaser must pay the actual average cost through a period of years and must in turn take into consideration this very feast and famine condition with which we are all only too familiar in the railway supply business.

If the railroads, like industries, could continue their normal purchases through such times as these, they would immediately have the benefit of the traffic in the movement of raw material for such manufacture, and in turn the handling of the traffic incident to the finished product on the way to remote customers, and an immediate benefit would be secured in the matter of the railroads being able to make needed repairs and maintenance at times when both labor and material were available, as compared with the difficulty in recent years in getting material when it was wanted, which prevented many needed matters of repairs and maintenance being attended to at the proper time.

We have heard from all sides in recent times the complaint that this or that could not be done because material and labor were not available and, yet, when both become plentiful, the purchases are curtailed.

Another very important item for consideration in this matter is the one of confidence which should be injected into the general situation immediately upon a general purchasing policy being established by important railway systems for the reason that the railroads themselves are the largest purchasers of all kinds of material and the moment one railroad begins purchasing it encourages others to do so with the immediate effect of brighter times for all concerned.

The fear that is now being felt that prices have not reached bottom is based on an unimportant consideration, as it must be realized that, in the main, prices do not vary to a sufficient extent to involve any considerable amount of loss, and, suppose loss does ensue, how long would it be before the industries of the country would be in the same position the railways were in at the time of the last rate increase? Is this desired? If not, buy now!

Railways Should Buy Only to Meet Pressing Needs

By Samuel M. Vauclain
President, Baldwin Locomotive Works

IN MY JUDGMENT this is the time for everybody to be careful and to act with the utmost prudence. I can only recommend railroads, manufacturers, merchants and housekeepers to buy sparingly and only in sufficient quantities to meet their most pressing needs. I feel that there must be a revision downward in the cost of everything, and it can only be accomplished safely by practicing the utmost economy, not only in business, but in all walks of life from the housekeeper upward.

Therefore, I cannot consistently and sincerely advise the railways that this is the time for them to buy regardless of their necessities. They must be left free to exercise their own judgment, and we as manufacturers must govern ourselves accordingly.

More Uniform Buying Would Cause Lower Prices

By Charles J. Symington
President, The T. H. Symington Company

IT IS NOT WITHIN the province of the manufacturer of railway materials to instruct the responsible officials of the railways as to when they should purchase equipment, but he can perhaps be excused for contributing to the discussion if he believes he can demonstrate that the immediate release of requisitions for new equipment and supplies will operate to the direct financial benefit of the railways themselves.

The fortunes of the railways and of industries are indissolubly linked together and no possible advantage can accrue to the former by the stagnation of the latter. The railways have it in their power by the purchase now of necessary equipment to shorten materially the period of industrial and economic readjustment through which we all are passing, to stimulate at once freight traffic through the resulting movement of raw materials, and, what should be of prime importance to themselves, to get new equipment into service and begin earning money months earlier than if such purchases should be delayed until spring.

The mistake should not be made of assuming that cars, if ordered three months from now, could be placed in service only three months later than if ordered at once. Many plants depending on railway work have recently made drastic reductions in their rates of operation and in their working forces, amounting in some cases to virtual shutdown. This condition will become practically universal among such plants if a moderate program of railway buying is not inaugurated before February 1. This condition will result in weeks and perhaps months of delay after the railways do decide to buy, before these plants can get their organizations rebuilt on an efficient basis.

Shutdowns and reorganizations cost money, and the ultimate consumer, in this case the railways, pays the bill. This must of necessity be so, as no manufacturer could keep out of bankruptcy if his costs were figured only on his good months. In our own plant we have not had, within my recollection, more than five good months in any one year, with the average around three. I believe our case to be typical and it should be obvious that a more uniform rate of operation would result in decreased costs and correspondingly lower average prices.

Under the particular circumstances which surround us at this time, most manufacturers are stocked up to a certain extent with high priced materials, solely because what looked like a buying movement last year came to a standstill before it had acquired any considerable momentum. This, however, is not such a factor in the present discussion as some of our purchasing agent friends might think. The price of

equipment is of necessity based on the cost of raw materials, but it is affected also by spasmodic buying and at this time particularly by the state of uncertainty which now exists as to when and to what extent railway buying will be resumed.

The present situation demands confidence, and I for one am ready to play with the cards face up. If the manufacturers can start running on railway work before their organizations shall have become scattered, the delay and expense involved in getting production up to its normal speed will have been avoided and satisfactory deliveries can be promised and made. I am convinced that immediate action by the railways would provide the needed impetus for a sane readjustment of business with, as a result, material prosperity for themselves and the prevention of much individual suffering and financial distress.

Uncertainties of Situation Militate Against Buying

By R. P. Lamont
President, American Steel Foundries

WE SHOULD ALL LIKE to see the railroads buy equipment and supplies at this time, and if they did come into the market in a large way it would be very effective in bringing an upturn in the business of the country in certain lines at least, but if I were at the head of a railroad property I am not sure whether I should buy at this time.

At the moment the prices of the various materials such as pig iron, coal, coke, oil, refractories, etc., are relatively high; labor is also at the highest point for many years; and it is difficult to sell securities even at a very expensive rate from a railroad standpoint. On top of this the railroads are confronted with a shrinking business and reduced earnings.

In short, there is nothing in the general industrial or business situation today to justify the buying of additional equipment; however, there is one important offsetting consideration in that there are still people in influential places who would like to see the railroads back under the control of the government, and the railroads are in the position of having to justify the present situation of private ownership by showing that they can give better service than under government operation.

If the roads do buy heavily at the present time and prices and business continue to decline, it will be unfortunate; on the other hand, if they do not buy and business should suddenly improve to an extent that would make it impossible for them to handle the business next fall, it would be a very serious matter. Because of this consideration, it would seem to be desirable for the roads generally to take advantage of the present slack business to get roadbeds and equipment in the best possible shape, and in addition to buy what other materials and equipment they can without any new financing.

It is difficult to say whether the present process of liquidation and readjustment has just begun or whether it is about completed. There are those who believe that many commodities, including wages, rents, real estate, together with the raw materials above mentioned, are still badly out of line with other commodities such as rubber, sugar, coffee, copper, cotton, wool, breadstuffs, etc., which have had a very severe shrinkage, and that there cannot be a general and sound resumption of business until this liquidation has become more complete. If this is true, the depression may drag through practically all of next year.

On the other hand, if the farmer should begin within the next few weeks to "cash in" his crops and resume buying of ordinary necessities, including agricultural implements, etc., thereby enabling the retailers to get rid of their stocks, so that they can in turn send in orders to the jobbers, who will then be able to replenish their stocks from the manufacturers, there may be a sharp revival of business in the spring. I believe we can have a pretty definite notion by the end of February as to whether or not this will come about, and I should be inclined to defer action on any large program until then.

Our business depends entirely upon railroad purchases, but the situation, as I view it, is so uncertain that I hardly feel like unqualifiedly urging any extensive buying program at this time.

An Opportunity to Prepare for Greater Economy and Efficiency

By Stanley H. Bullard
Vice-President, Bullard Machine Tool Company

THE SPIRIT of optimism which is the predominant note of every informed statement on business conditions of today, and the future, is founded on the basic soundness of our position, and the fact that true values are resulting from the period of readjustment through which we are now passing and from which we will soon emerge.

It is evident that the "new era" will be one of strict economy—one in which economy will be practically and wisely exercised—one in which judgment and not expediency alone will prevail in every transaction.

There are certain indications that a realization of the necessity for this new brand of economy is sinking deep into the consciousness of practically every unit of our industrial and business structure. And this is good; for it will eventually result in a constantly increasing efficiency in the use of equipment, a higher sense of responsibility for the good condition of such equipment, and, even though wages are maintained at high levels, an actual lowering of costs in practically every line of production.

We are mentally prepared for this outcome. Are we taking the proper and timely steps to place our shops in a state of proper physical preparedness?

Equipment which has been stressed to its limit in the last few years, and during that time has been at the tender mercy of "the best we could get," is today in doubtful condition to permit truly economical operation. This applies to almost every item and *now* is the time, in fact the big opportunity, to make a careful survey, put it in shape or replace it with something which will meet the coming demands, and do it with economy.

Equipment manufacturers are in an exceptional position to serve, either in the matter of maintenance repairs (both material and experienced labor) or in the matter of replacement by prompt shipment of equipment of the latest and most efficient design. They are also now able to aid the officials in charge of shop operation in the planning of better and cheaper methods of performing shop work, bringing to these problems a new viewpoint.

Certainly we are all of us wiser than the Irishman who wouldn't mend his roof when the sun shone, because it didn't leak, and when it *did* leak, couldn't mend it because of the rain.

Railway Buying and General Business

By E. B. Leigh

President, Chicago Railway Equipment Company

With reference to the advantages of a "Buy Now—Ship Now" policy, not only to the railways themselves but to the country at large: Let me first call attention to a fact, familiar to you, namely, that it has been amply demonstrated that for a period of over fifteen years prior to the Great War, railway purchases not only initiated general activity, but also that once thus started, sustained a general buying movement, and with its logical reflection in general business—in a word, general business prosperity. While this relation was largely suspended during the abnormal conditions of war, the principle is as sound today as ever.

As we are now passing through a period of drastic liquidation, it may be urged that commodity prices have not yet reached their lowest level; while the labor question is far from being adjusted as eventually it must be—hence that it is not yet an opportune time to initiate extensive buying.

Under normal conditions this situation might properly influence and delay all purchases, where postponement is possible, until these important factors have become stabilized.

But are we, or are the railways, operating under "normal" conditions?

It is well known that railway facilities are entirely inadequate, both in requirement and condition; that purchases on an enormous scale must be made before our railways, as a whole, will be able to take care of the country's requirements, once the temporary depression is passed and the several years of unprecedented business, confidently predicted by nearly all authorities, are upon us.

At this particular time, and in view of the unusual conditions surrounding them, it would seem the part of wisdom for the railways to consider the possibilities of ultimate, rather than immediate cost of facilities, when measured in terms of the consequences of delay; for it is worth while to remember that ultimate cost may involve factors other than present price. A margin of price obtained by delay might prove an expensive economy if the delay itself entailed disaster.

Most serious is the prospect that in the next large freight movement (not far off from the most pessimistic standpoint, if measured by the time absolutely necessary for construction), inadequate facilities, poorly maintained, will mean *unsatisfactory service.*

If that occurs it will take every resource of skill and organization to keep the railways in private control. What could prevent this issue from dominating the next presidential campaign? If ever anybody needed the caution against the temptation to be penny wise and pound foolish it is the railways of the United States in the year 1921.

The present period of depression affords an ideal opportunity for the manufacturer to produce and the railways to transport the needed facilities. By so doing both are active; each would gain: the railways by utilizing their present equipment in acquiring their materials and devices; the manufacturer in making prompt deliveries; while each would gain valuable time and headway in that inevitably vast rehabilitation of the railway's carrying facilities.

In view of the situation outlined, and the probable helpful effect upon business generally, surely it would seem wise to "buy now" and "ship now."

Photo from Ewing Galloway

A Cotton Warehouse Yard

Railroad Power of Rehabilitation Returning

Budgets Indicate Gradual Re-establishment of Railroad Credit, With Which Expenditure Will Keep Pace

THE RAILROADS of the United States have been considering 1921 programs for additions and betterments which, in terms of new bridges, new rail, ballast, shop extensions, and new equipment approximate a normal pre-war year's work. This statement is based on information furnished us at our request by the presidents of nearly all of the large railways of the country, approximately one-fourth of whom gave us detailed information concerning the projects now under consideration, these roads being so widely scattered and operating under such diverse conditions as to be representative of the railroads of the entire country. While this program may seem conservative, when compared with the cumulative effect of several years during which not much expansion work has been done, it marks a distinct advance toward better conditions, and the fact must not be overlooked that to raise nearly $1,500,000,000 now required to carry out such a program would place a strain on the credit of the roads more than twice as great as was required to raise between $600,000,000 and $700,000,000 a year before the war.

Executives are keenly appreciative of the need for extensive improvements, and increases in railroad facilities, and there is probably no group in the country more anxious that this need be supplied within the shortest possible time. This statement of the receiver of a large line is typical of similar expressions by others.

"In common with most southwestern lines * * * terminal facilities are inadequate, and if funds were available we would like to spend about $6,000,000 per year in providing freight train yards and facilities for caring for equipment, passing tracks and ballasting. If we were able to spend $5,000,000 or $6,000,000 for the next six years we would include in improvements stretches of double track and about 400 miles of automatic block signals."

The president of an eastern railroad says:

"Should business develop, as I believe it must, this company would need, say, 50 locomotives and 3,000 freight and coal cars, as well as 75 passenger cars. We ought to spend on additional running tracks, yards, stations, and other facilities from seven to ten million dollars."

A western railroad is planning to spend about $12,000,000 in improvements, including the acquisition of new shops and equipment, probably over a period of three years or more.

RAILROADS possessing cash or credit are pushing ahead with their betterment programs. Other large programs are awaiting the gradual restoration of railroad credit.

The general attitude of railroad executives reflects confidence in the ultimate working out of the present uncertainties to a satisfactorily stable basis, but this faith is tempered by a disinclination to take chances with the solvency of the properties on a guess as to just when the desired stability will be attained.

While it is impossible to discuss in detail what may be considered the railroads' maximum expectation for the year's capital expenditures, it is evident that the largest item would be for new locomotives and freight cars and that, amounting to about one-half of the total, it would be proportionately a little larger than the average. Of the remainder, the greater proportion would be spent in renewing bridges, relaying rail, providing additional passing tracks and second tracks, and in public improvements, such as grade separation projects and new stations. Yards and terminals, shop extensions and shop facilities together, apparently come in for considerably less than one quarter of the total.

In general, comparatively little new passenger equipment is under consideration. That this is not because of any failure to appreciate the need for additional passenger cars is evident from the following statement by an eastern railroad president:

"It was our expectation to expend approximately $1,225,000 in the purchase of additional passenger train cars during 1921, but in view of the decision of the Interstate Commerce Commission that no moneys would be loaned from the $300,000,000 revolving fund for the purchase of such equipment until practically all other needs have been met, it has been found necessary to postpone such purchase until a later date."

Year's Work Now Uncertain

What the railroads have had under consideration and what actually is likely to be done may be quite different matters. The extent to which all the projects being contemplated will be definitely developed and the extent to which they will be carried out is very uncertain at the present time.

There are five principal reasons for this uncertainty, not all of which affect every case, but some one or more of which is at present exerting a powerful influence to defer the definite formulation of betterment programs on a scale satisfactory to railway executives. These are: First, the sharp business recession since October; second, inability to forecast the full effect on net earnings of the new freight and passenger rates; third, failure to effect settlements with the United States government for the period of government control and the subsequent guaranty period; fourth, the slowness with which loans have been released from the $300,000,000 fund created by the Transportation Act, and fifth, the convic-

tion that the prices prevailing during the closing months of 1920 are excessive.

The marked reduction in traffic which has been evident since the latter part of October has had a most marked effect in holding up or causing a complete revamping of programs for the coming year. Thus, the chairman of the board of directors of a southern road says:

"We had outlined a comprehensive plan of development which we now feel, owing to the very considerable recession in business, will be materially modified. Under these conditions I feel that we should go slow in making forecasts and determining just what should be the program for 1921, until we see the signs of revival of business, which I personally feel will take place after the first of the year."

The president of another road says: "At the present time I feel like postponing all expenditures except such as are absolutely necessary until we can see a little farther on."

The president of a western railroad system says that, until business improves, "we have felt that it would not be practicable to make any budget of improvements for next year, because expenditures in that direction necessarily will depend upon the revival of business."

There is an inkling of the problems of management created by the decrease in the volume of freight movement in the statement of the president of another road, who says "I spent some little time in getting the * * * organization into the frame of mind necessary to enable it to deal with a slump in traffic and until there is a radical change in the business outlook I don't want to begin talking to our people about spending money for improvements unless it is something necessary for safety of operation or service to the public."

There are a number of railroads whose credit standing is such that the only means of financing additions and betterments is from surplus earnings. The showing made by such railroads, particularly in the west and southwest, under the new rates during the month of September and October were sufficiently encouraging to lead to the development of tentative improvement programs. The effect of the decrease in traffic on these roads is clearly brought out in the following quotation from the president of one of them:

"The great slump in business which has occurred in the last six weeks and the outlook for its continuance for some months has made it necessary for me to revise the plan which I had in mind and will probably make it necessary for us to hold our expenditures down to those matters which are more or less inseparably connected with the maintenance work, or which are required by state or federal authorities."

Several conditions have arisen in the short time since the increase in freight and passenger rates went into effect which make it very difficult to foresee just how closely they will produce an average net operating income equal to six per cent on the valuation. In the first place the rates have only been in effect for a period of four months, and during that period the heaviest average daily traffic movement ever recorded has been followed by a slump that has reduced traffic to a point considerably below the average for the first six months of 1920, the basis on which the rate increase was established. Furthermore, during September and October, two months of unusually heavy traffic, the net operating income of the railroads as a whole was respectively $34,000,000 and $26,000,000 less than the six per cent average designed to be produced by the rates, although the first returns for November are more favorable.

Other factors adding to the uncertainty as to the adequacy of the present rates are stated thus by the president of an eastern railroad: "First of all the rates authorized are not yet all in effect and few, if any, of the roads have been able to adjust their operations, and particularly their forces, upon anything like a stable basis."

Considerable time will probably elapse before operating practices become stabilized on an efficient basis, and until it is generally believed that such a basis has been reached, no one can say with certainty how far it may be possible to offset conditions unfavorable to the present rates, by decreases in operating expenses.

At the present time, therefore, the ultimate effect of the rates in restoring railroad credit is largely a matter of conjecture.

The first and second causes for uncertainty as to what capital expenditures may be made during the coming year are of very general application; there are probably few instances in which they have not exerted a material influence towards limiting expenditures in the immediate future. The failure to secure settlements with the government, particularly for the six months' guaranty period, and the slowness with which negotiations have been completed for loans from the revolving fund are not of general application, but in the aggregate the amounts involved are great enough to produce a marked effect in delaying the effective rehabilitation of the nation's transportation system. Approximately $400,000,000 due the carriers under the guaranty provisions of the Transportation Act is locked up in the United States treasury awaiting a decision in mandamus proceedings before the Supreme Court of the District of Columbia to determine whether the treasury department's strict interpretation of the act shall prevent the roads from having access to any portion of this sum until all claims have finally been adjusted.

Following considerable delay at the outset in interpreting the provisions of the Transportation Act pertaining to the distribution of the $300,000,000 revolving fund, loans are now being approved with much greater celerity and at the present time probably about two-thirds of the total amount has been authorized. This leaves approximately $100,000,000 still available. When this is added to the $400,000,000 guaranty fund, the total amount thus withheld very closely approximates the average annual expenditure for additions and betterments made by all the railroads during the years immediately preceding the war period.

Just how this situation has affected some individual railroads is indicated by the following statement of the president of an eastern system:

"What we shall be able to do in that year (1921) is problematical and largely depends on what settlement we may make with the government under the contract and during the guaranty period; when we secure the money, and how much; and also upon financial conditions generally in the immediate future."

The president of a small railroad in the central district which has plans developed for the expenditure of approximately $1,800,000 in 1921 says, "Whether we will be able to do much of it or not will depend on whether we can work out some settlement with the government which now owes us nearly $3,000,000. Up to this time we have been unable to get anything and are naturally pretty short of cash."

The belief that present price levels are excessive and cannot long be maintained, in some cases is also a powerful factor in reducing capital expenditures to bare necessities.

"Who has the nerve to buy a thousand freight cars at $3,200 to $3,500 a car, or locomotives at $55,000 to $70,000, or undertake large construction jobs with an eight-hour day program and existing rates of wages? Who will build extensions to railroads with steel at $55 to $57 a ton? * * *

"Manifestly there is some work which must go on willy nilly; but * * * a suit of clothes with patches on the seat are still clothes and a man may still present himself in public and bide his time till the price of another suit comes within reach."

This is the statement of the president of an eastern railroad having $20,000,000 in bridge and grade separation projects, shop extensions amounting to $1,000,000 and a new

equipment program amounting to about $3,000,000 "which ought to be put in hand."

The president of a southern railroad who has authorized expenditures for double track, reduction of grades and other roadway expenditures since the return of the railroads to private control aggregating more than $12,000,000, and who hopes to appropriate considerably larger amounts during 1921, says: "The present prices for equipment of all classes are in my opinion quite excessive and unless material reductions are brought about we may not be able to increase our ownership on the scale now in contemplation. * * * We have some very pretentious ideas as to additional equipment but I am afraid that we shall be obliged to go rather slowly."

Programs Definitely Undertaken

But in spite of all these unsatisfactory conditions tending to withhold expenditures on a large scale, a number of extensive projects have been definitely laid out for execution this year. Others undoubtedly will be decided upon in ample time for completion before the end of the year, as many railroads do not take up final consideration of their budgets until after January 1. Many improvements started during 1920 also will be carried on or completed during the current year. These projects will add materially to the volume of work under way during the year as well as to the facilities which will become available before the end of the year.

The few definite programs, knowledge of which is available, call for total expenditures, including equipment, ranging from approximately $2,500 to $26,000 per mile of line.

The Delaware & Hudson Company is planning line reconstruction and new yard projects involving a total expenditure of $2,250,000.

The Southern Pacific, Texas and Louisiana Lines, has recently authorized expenditures of over $16,000,000, of which $8,750,000 is for the purchase of equipment or the construction of equipment in its own shops, $3,800,000 is for ballasting, $2,800,000 for rail relaying and $700,000 each, for the purchase of new shop tools and for bridge work, respectively.

The Chicago & Alton will spend $2,404,000 for equipment which will become available during 1921, and will complete a new freight house and general office building in Chicago, costing $1,960,000. In addition to this the freight yard and engine terminal at Springfield, Ill., will be enlarged at a cost of $425,000, and $195,000 will be expended on second main track. Other additions and betterments amounting to $200,000 make a total of $5,184,000 in additions and betterments which are all expected to be in service before the end of 1921.

The Richmond, Fredericksburg & Potomac, with only 119 miles of line, is spending a little more than $1,000,000 on improvements, $500,000 of which is for the purchase of new equipment or rebuilding of existing equipment, while a slightly larger amount will be expended in additional engine house facilities, shop tools, freight station and classification yard enlargements and the construction of a new electro-pneumatic interlocking plant.

The Delaware, Lackawanna & Western will undertake a grade separation project through the city of East Orange, N. J., that will involve a total expenditure of about $4,000,000.

The Chicago, St. Paul, Minneapolis & Omaha now has under contract 10,500 tons of rail, 10 locomotives, 125 stock cars, five new station projects and extensive yard and station improvements at five terminal points. This work will aggregate $2,100,000 and will all be completed in 1921. The full program for the year, of which this forms a part, has not yet been completed.

The Missouri, Kansas & Texas has tentatively outlined a program for improvements for this year aggregating approximately $22,500,000. Of this amount over $12,000,000 is for 60 passenger cars, 2,800 freight cars and 40 locomotives; $6,600,000 is about equally divided between shops and engine houses and terminals and yards; $900,000 is for new rail, $886,000 for stations, $701,000 for signals and interlocking plants, and the remainder for ballast, bridges and shop machinery.

The budget of one eastern road, averaging $7,000 a mile of line, will be spent as follows: $3,000,000 for new freight locomotives, $900,000 for seaboard terminal improvements and about $1,000,000 for new passing tracks, terminal facilities, double track and miscellaneous improvements, to be completed during 1921.

The Norfolk Southern has made definite plans to spend about $400,000 on grade revisions and strengthening bridges, which will practically double the train haul between Raleigh and Charlotte, N. C., a distance of 156 miles. This road is also planning to spend about $250,000 on the rehabilitation of 400 freight cars.

The Boston & Maine is planning to purchase 27 new switch engines and 10 freight locomotives.

The Chicago, Indianapolis & Louisville will build a $200,000 steel freight car repair shop and expects to spend $350,000 for new locomotives.

The president of a large eastern railroad says: "We are going along and authorizing upwards of $1,000,000 of new work every month, and have been doing so right along during the past because the * * * company is obliged to do about that each month whether it wants to or not in order to measurably keep up with the procession." This money is spent on such additions as new industrial tracks, enlargement of certain facilities, grade separation and new equipment.

These budgets are reasonably certain of execution during the coming year and they are typical of the plans of other railroads that will be carried out in spite of present uncertain business conditions.

Among the projects under way but incompleted which will be continued during 1921, the Nashville, Chattanooga & St. Louis has appropriations for new capital amounting to $273,000 for additional terminal facilities, $314,000 for other roadway improvements, $264,000 for additional freight cars and $93,000 for other equipment.

The Wheeling & Lake Erie is spending about $1,500,000 on additions and betterments, approximately $1,000,000 of which will be used during 1921. The improvements contemplated are additional yard and terminal facilities at Jewett and Canton, Ohio, and car repair facilities at Brewster, Ohio.

The Long Island now has under way yard addition and improvement projects amounting to $500,000 and is spending $540,000 on additional high tension transmission lines to reinforce its electrical installation.

Some of the other projects already under way are the construction of equipment and the building of a double track on portions of the Virginian which, including additional side tracks and improvements in terminal facilities, involve a total expenditure of approximately $10,000,000; the building of a cut-off on the Kanawha & Michigan and the enlargement of yard and engine terminal facilities on the Texas & Pacific.

Contracts have been let by the Atchison, Topeka & Santa Fe for the construction of new shops at Albuquerque, New Mexico, involving an expenditure of nearly $2,000,000.

The Outlook

The general attitude of railroad executives is not one of pessimism; rather, it reflects confidence in the ultimate working out of the present uncertainties to a satisfactorily stable basis. This underlying faith, however, is tempered by a disinclination to take chances with the solvency of the properties on a guess as to just when the desired stability

will be attained, and it is also restricted in its effect by a lack of credit not within the power of the executives to overcome immediately. One railroad president aptly summarizes the situation as follows:

"While the outlook under the new rate basis * * * is very encouraging, the actual status of the company is that of being convalescent at the moment, and this, I take it, is true of the great majority of American railroads.

"Because of the very poor showing which all of the companies made as a result of operation during the period of federal control, more or less—generally more—doubt has been cast upon the earning possibilities of the companies and consequently upon their credit, and those who determine the standing of railroad credit will want to see the results from a number of months of operation on the new rate basis before reaching a definite conclusion."

The impossibility of any overnight rehabilitation of the railroads' properties and the need for patience on the part of the public is also touched on by the president of a western system. He says:

"I do not think the public should expect too much of the railroads at too early a date. The Transportation Act of 1920 and the increased rates are calculated to restore railroad credit but this will take time and until it is so restored that financing can be done on a reasonable basis railroads cannot go ahead with any comprehensive program of expansion and improvements. When the way is clear for financing, the next step will be to make arrangements therefor. After such arrangements are made, it will then be in order to look for such an improvement in the railroad plant as the needs of the country require and the public expect."

The whole matter sums up to just this: Those roads fortunate enough to possess cash or credit are pushing ahead with their betterment programs, but in general, extensive programs must await the restoration of railroad credit. Credit restoration, at best must be a gradual progress, and the sharp recession in business has temporarily stopped the process. In the meantime the provisions of the Transportation Act to tide the roads over this transition period are functioning only partially and may or may not function completely before the period is past.

With one exception the factors affecting credit restoration must take their course through the "mills of the gods." The volume of traffic alone is subject to some control and this is in the hands of the shipping public.

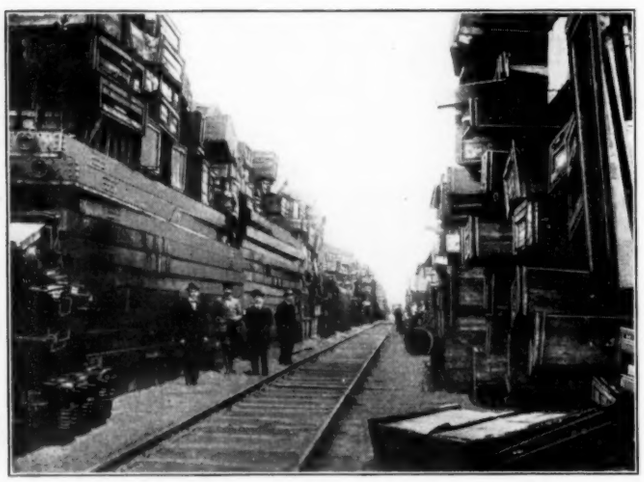


Photo by International

American Cars Unloaded at Danzig, Poland, Ready to Be Assembled

New York Central Proposes Lease of Chicago Junction

THE NEW YORK CENTRAL has filed formal application with the Interstate Commerce Commission for authority to lease, operate and ultimately purchase the Chicago Junction Railway Company terminal properties at Chicago. The project proposes the unification of related lines for greater economy and efficiency, and concerns properties valued at about $33,000.000.

The New York Central has long needed larger freight terminal facilities at Chicago, and the lines embraced in the proposed merger are the only such properties remaining unconnected with a large trunk line system, spreading over the important industrial districts of southwestern Chicago, including the Union Stockyards district. Included in the plan are the lesser terminal properties of the Chicago River & Indiana.

The Chicago Junction terminal facilities connect directly with the New York Central's "outer belt line"—the Indiana Harbor Belt Railroad—forming a natural extension of this company's rails into the heart of the city's southwestern industrial section, and thereby assuring to both railroads an increase in efficiency and capacity which has been impracticable under independent operation. The terminal properties have superior connections also with three other railroads of the New York Central system—the New York Central, the Michigan Central and the Big Four—each of which will be provided with better terminal service for all of its heavy Chicago traffic.

The application states that extensive immediate improvement and development of the existing terminal facilities, which could not possibly be duplicated, is planned. It enumerates in detail the various operating conditions which make acquisition of the additional terminals by the trunk line distinctly a matter in the public interest and cites the ways in which the efficiency and capacity of both the terminal properties and the existing facilities of the trunk line would be enhanced by the consolidation. It is stated that at present the natural flow of a large amount of freight traffic over the main lines actually is impeded and delayed by circuitous routing because of the inadequacy of terminal facilities at Chicago.

The territory served by the Chicago Junction terminal lines, in its extremities extends from Western Boulevard on the west to Lake Michigan and from Forty-ninth street on the south to Ogden avenue.

The Chicago Junction, in general, includes a double-track inner belt line 23.94 miles long, with side tracks and industrial tracks aggregating 168.66 miles. It owns 68 locomotives and 291 cars. The Chicago River & Indiana owns 15.71 miles of terminal road, all within the city of Chicago, and has trackage rights of 28.87 miles over other roads. It owns 9 locomotives and 264 cars. The foregoing are the figures given by Moody's Manual.

The proposed method by which the terminal properties are to be acquired by the New York Central provides for the purchase of all of the capital stock of the Chicago River & Indiana, and the lease thereto, with right of ultimate purchase, of all the properties of the Chicago Junction Railway Company. The properties have been exhaustively examined by experts as the basis for appraisal of valuations.

PRAISE FOR PRIVATE CONTROL.—Nowhere has the spirit of American efficiency been manifested more strongly than in the management of the railroads since their return to private control last March.—*N. Y. Commercial.*

Fig. 1—Railroad Operating Revenue as Compared with Railway Purchases

Railway revenue, which furnishes the financial basis for car purchases, is represented by a relatively straight line, with slight vertical fluctuations and with an upward movement that shows little interruption. The curve representing car purchases, however, is highly irregular and is subject to exteme fluctuation.

The Next Step Toward Preventing Depressions

Stability of Railway Purchases Offered as Remedy by Railway Business Association Committee

"As CAUSES of industrial and commercial depression, crop failures and money panics have been made unlikely. The next step toward continuity of general business and employment is to stabilize railway purchases." This is the conclusion stated in a report made by the Committee on Stability of Railway Purchases of the Railway Business Association's general executive committee.

The committee points out that if the several governmental units and the public utility companies were to pursue a policy of doing their heaviest improvement work in times when

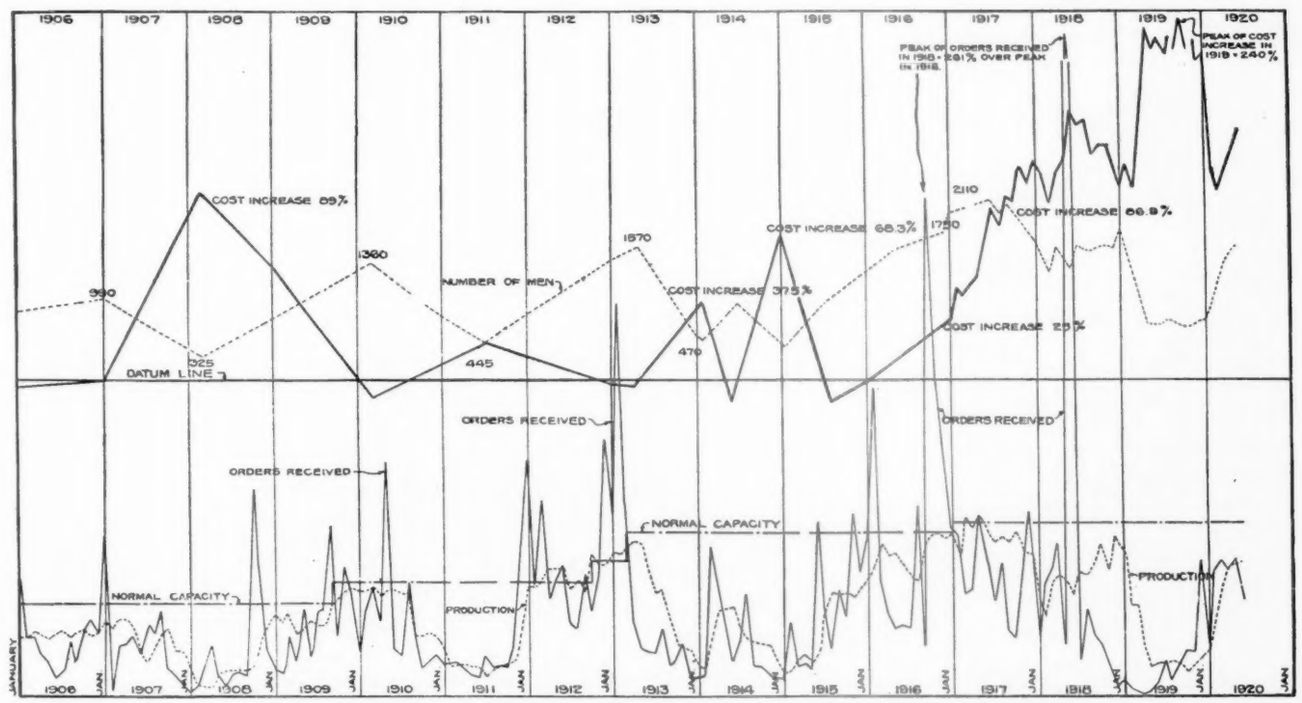


Fig. 2—The Experience of an Industrial Company Supplying Railway Materials

This shows strikingly the relation between volume of railway orders and the production cost level. With the decline in orders and production in 1907, the production cost increase was 89 per cent; in the same time the number of employees fell from 990 to 325. With the revival of railway purchases in 1909 and 1910 the number of employees rose to 1,360, and shop costs dropped to a lower level than had prevailed in the prosperous days of the end of 1906. Similar correspondence between the curves of railway orders, production, number of employees and production cost prevails throughout the chart. It is maintained after the outbreak of the war, though beginning with 1915 costs show a pronounced independent upward tendency.

general business is slack and unemployment serious, and the steam railways followed the same course, the ups and downs in forestry, mining, manufacture and trade would be greatly mitigated, if indeed acute unemployment were not thereby reduced almost to the negligible.

The general executive committee requested the chairman of the Committee on Stability of Railway Purchases, in co-operation with the president and secretary, to prepare the first of a series of documents setting forth the substance of the report for circulation among the railway supply manufacturers and among the railway managers. The chairman of the committee is S. P. Bush, president and general man-

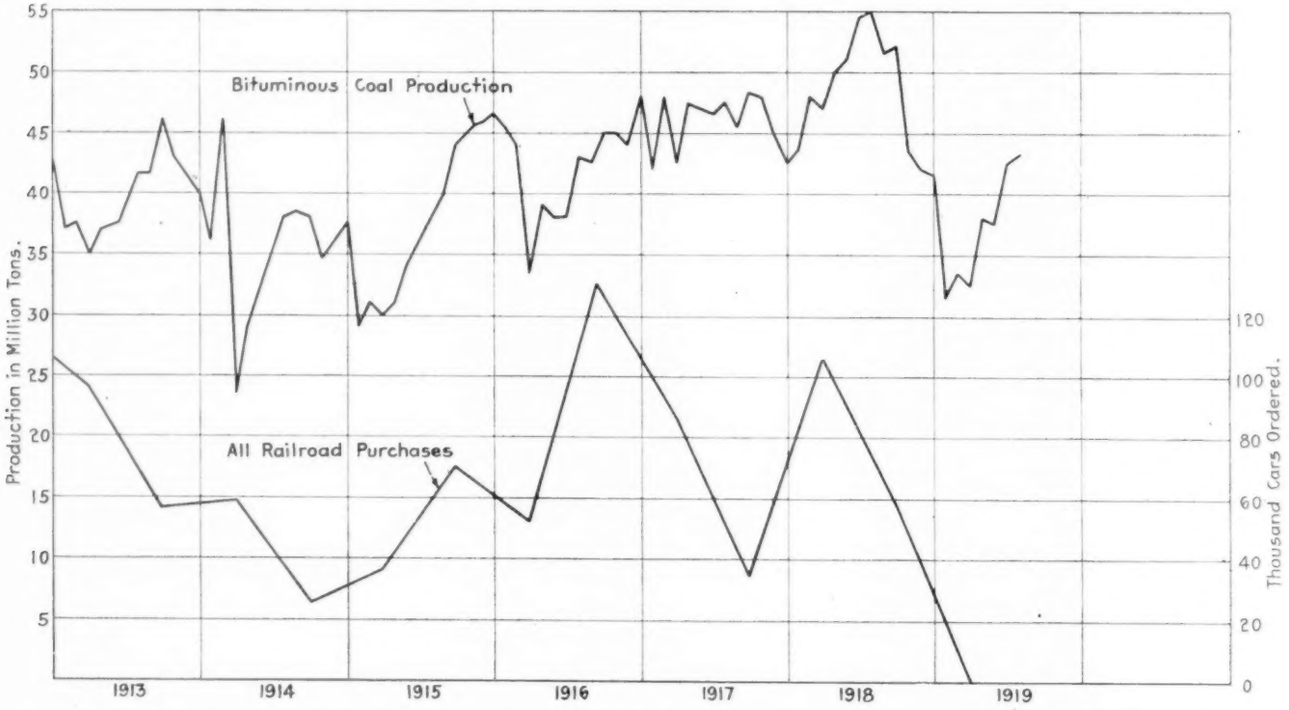
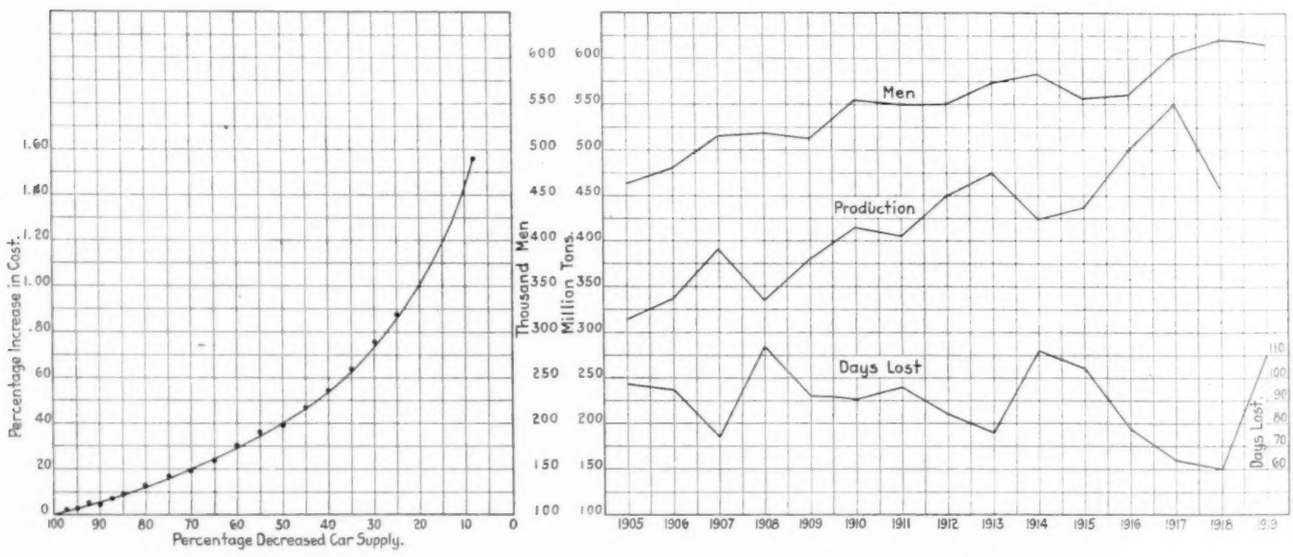


Fig. 3—The Relation Between Railway Car Purchases and Employment in Bituminous Coal Production

This chart, while it does not display the minute correspondence that is characteristic of the two preceding ones, indicates a general relation that is striking. Car orders dropped heavily in 1913; coal production first dropped and then recovered, but rushed downward rapidly early in 1914 by way of compensation. The subsequent upward swing appears first in the railway order curve late in 1914 and extends to the coal production curve with the beginning of 1915. The downward movement appears in the car order curve late in 1915 and in coal production in January, 1916. The car order slump in 1917 is not reflected in coal production; this is of course explained by war conditions, which accelerated business in some directions, while retarding it in others, including railway equipment manufacture. The long downward curve in 1918 appears first in railway purchases and afterwards in coal production.



Figs. 4 and 5—The Production of Bituminous Coal in Relation to Car Supply

The chart on the left refers to cost of production. "The particular cause of lost operating time here selected for analysis was car shortage," says the American Institute of Mining and Metallurgical Engineers, which prepared the chart. "Other causes, such as mine disability or dull market, would doubtless have increased costs in the same manner. It is the interruption to operation, not the cause of the interruption, which raises prices." The upward sweep of the production cost curve is rapid and would apparently, if car supply reached zero, attain to that paradise of mathematicians, infinity. The chart is based on monthly records of car operators in the New River district of West Virginia which produced 7,231,343 net tons in 1917.

The chart on the right shows the relation between intermittency of employment in bituminous coal production, the number of men required to get out the year's supply under that condition, and the consequent labor cost.

ager of the Buckeye Steel Castings Company, Columbus, Ohio.

Responsive to the authorization mentioned above the following has been drawn:

Digest of Report of Committee on Stability of Railway Purchases

Certain strong railway systems have in the past or present boldly made large improvements in dull periods. Their theory was that the accumulation of idle locomotives in roundhouses and idle cars on sidings was the signal to buy more locomotives and cars; because never could they be bought so cheaply as then and never would there be so much available track and motive power wherewith to transport the materials of engine and car construction without crowding general merchandise traffic off the ways. The same applies to construction of track and all appurtenances of the railway, as well as terminal improvements and enlargements.

Not only are these facilities obtained within such periods at least cost for material and labor and at least inconvenience to general business, but the roads so promptly and economically equipping themselves are ready to carry the next peak of load when it comes. It has always been recognized by those close to the situation that such large railway buying has mitigated unemployment and eased the financial strain upon many industrial and commercial institutions. As adequate railway revenue is essential to a stabilization of purchases, the committee will observe the financial results of railway operation under the rate schedules recently initiated by the Interstate Commerce Commission with a view to offering such recommendations as experience may make desirable.

Origin of This Committee

The Committee on Stability of Railway Purchases was named in response to a clause in the annual report of the general executive committee for 1920:

"Promotion of such stability has long been a part of our work. We have continually declared that sufficient railway income should be permitted for accumulation of a surplus as the basis of carrying on addition and betterment work energetically during times of depressed traffic and earnings, thus avoiding the extreme ups and downs which affect the railway supply industry and which are so costly for all concerned. We have said that the government should give and the railways seize this opportunity to effect economy and to stabilize employment of labor and plant."

The committee has constructed 11 charts illustrating the bearing of railway purchases upon the welfare of labor and of general business. The charts are now printed for the members of the association and others interested.

Benefits General

While stability for the railway supply industry would be a direct result of stabilizing railway purchases, the benefits would be widespread and would extend far beyond the limits of any one industry. "The stabilization of national industry through a soundly constructive railway transportation policy and economical railway purchasing" is the true aim of the committee, according to its report. "A soundly economic purchasing policy can hardly be inaugurated and carried forward unless the general policy governing the railway transportation industry is sound and constructive," the report adds.

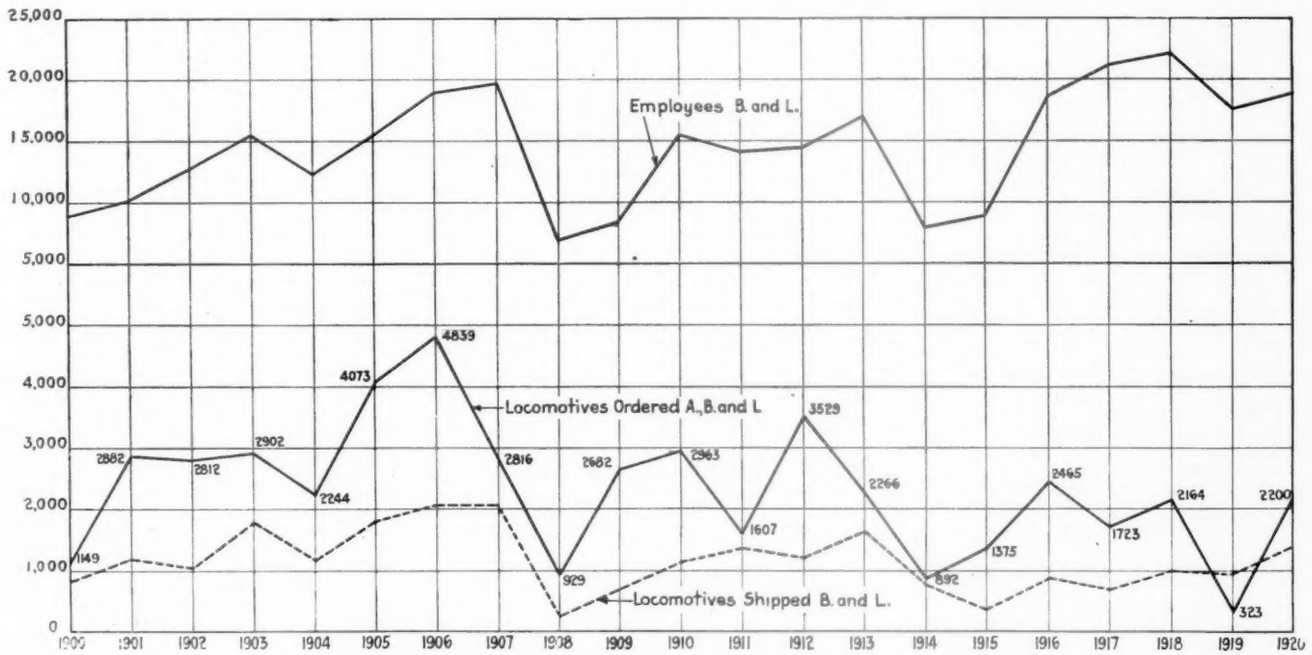


Fig. 6—Locomotive Construction as Affected by Railway Purchases

The chart which shows graphically the effect that orders and deliveries of locomotives at the American, Baldwin and Lima plants have had upon the employment of labor there since 1900. The curves rise and fall in unison throughout the chart. Such variations as orders of 4,839 locomotives in 1905 and of 929 in 1908 are shown to be attended by such decreases in employment as from 19,500 in 1907 to 7,000 in 1908.

E. B. Leigh, appearing on behalf of the Railway Business Association before the House Committee on Interstate and Foreign Commerce on September 15, 1919, testified to the magnitude of the railway supply industry:

"In general I make the statement that no occupation except agriculture employs so many people as do railroading and providing the needs of railroads. From raw material to finished product those employed in railway supply industries are believed to be pretty close to 2,000,000. Apparently another 2,000,000 are now employed by the railroads themselves, a large number of these engaged in the maintenance, improvement and extension of the properties.

"If new railroads were in the course of construction the number of employees would be increased by many thousand more whose existence makes no entry upon the statistics of

employment compiled by the Interstate Commerce Commission until the new road is completed and actually doing business as a common carrier."

indicates, be highly advantageous to the country even if it carried no other beneficial results in its train. The steel industry in the days before the formation of the United

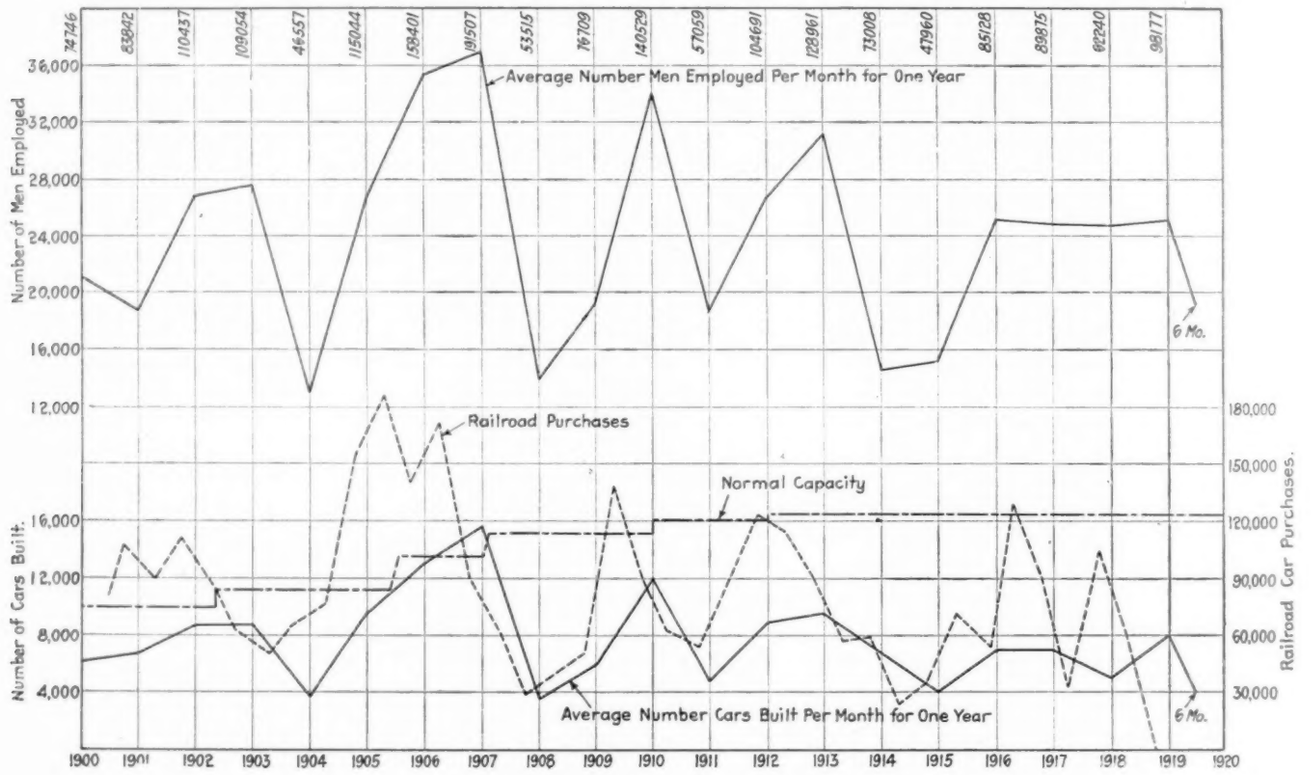


Fig. 7—The Car Building Industry as Affected by Railway Purchases

The curve showing the number of cars built follows the curve of railway purchases at an interval of some months, which represents the time elapsed between the receipt of the order for cars and the completion of the cars. The curve representing the number of employees varies directly and immediately with the production curve, dropping from 128,961 in 1913 to 73,008 in 1914, and rising to 85,128 in 1916. The production curve rarely reaches the line representing the normal capacity of the plants and remains far below that line for the years since 1907.

Prince and Pauper

The stabilizing of an industry so huge and so far-flung as the railway supply industry would, the committee report

States Steel Corporation, Andrew Carnegie once said, was either prince or pauper. The railway supply industry, while it never resorts to passing the hat, has its long-drawn-out

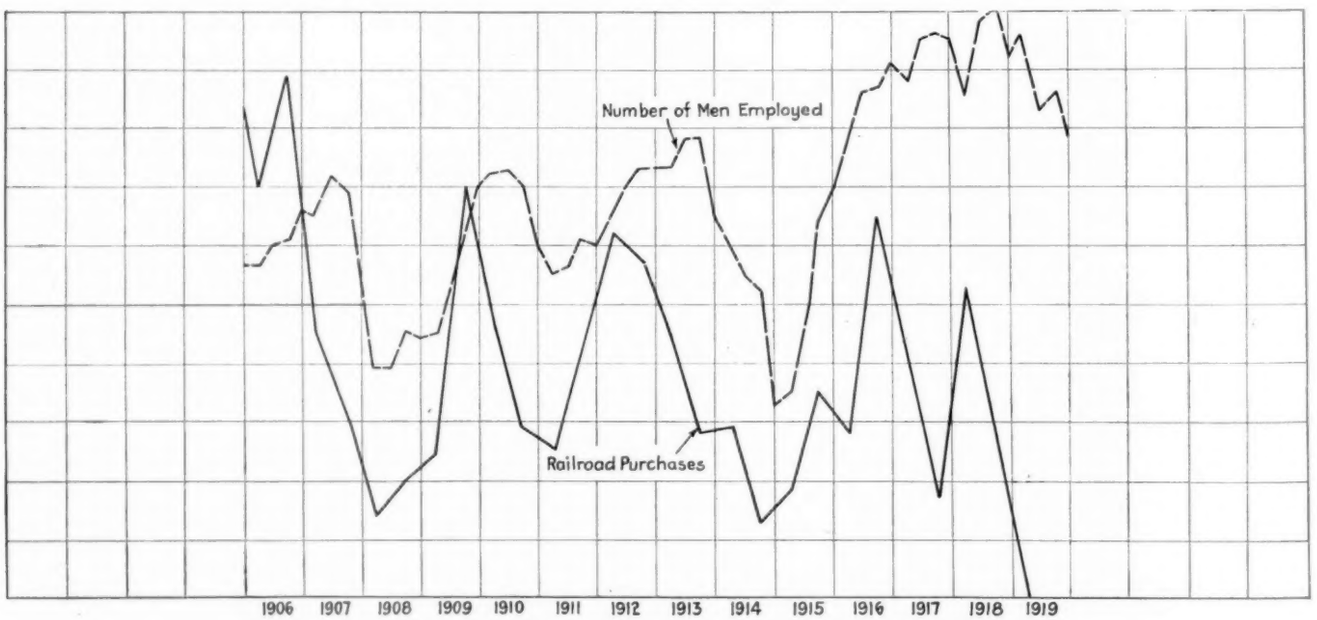


Fig. 8—Employment in the Steel Industry as Affected by Railway Purchases

Employment in the steel industry, as shown by the experience of the United States Steel Corporation since 1906. The curve showing railway purchases describes wide sweeps up and down the chart. The curve showing the number of men employed follows the railway purchase curve at a discreet distance, from which observers deduce that in relationship of the two the railway purchase curve is cause rather than effect.

pauper periods, which subsist on the comparatively princely intervals and which necessitate relatively high wages for capital and labor during the prosperous interludes if the industry is to be prepared to discharge the demands made upon it.

Idle time on the average has been estimated by some authorities as high as 50 per cent in the coal mining industry, 70 per cent in the entire steel industry, 62 per cent in the steel castings industry, 55 per cent to 60 per cent in the car building industry and 65 per cent in the locomotive building industry. If buying continues to be conducted in the present sporadic manner, further additions to these plants will be necessary to care for the next business advance, and these additions will themselves, over a period of years, republic utilities, as well as the federal, state, county and city governments, would conduct their buying moderately when trade is brisk and come boldly into the market for labor and materials when business is slack depressions would be greatly mitigated if not done away with altogether."

The reason, Mr. Johnson explained, why a railway could pursue such a policy successfully, though it would in many businesses not be feasible, lay in the fact that a railway, even though its business had fallen off, could predict with certainty that in a short time its facilities would be overtaxed and that certain additional facilities, both of way and of equipment, would be required. It could proceed to place its orders with certainty, just as Ole Hanson while he was Mayor of Seattle found he could do in the case of street

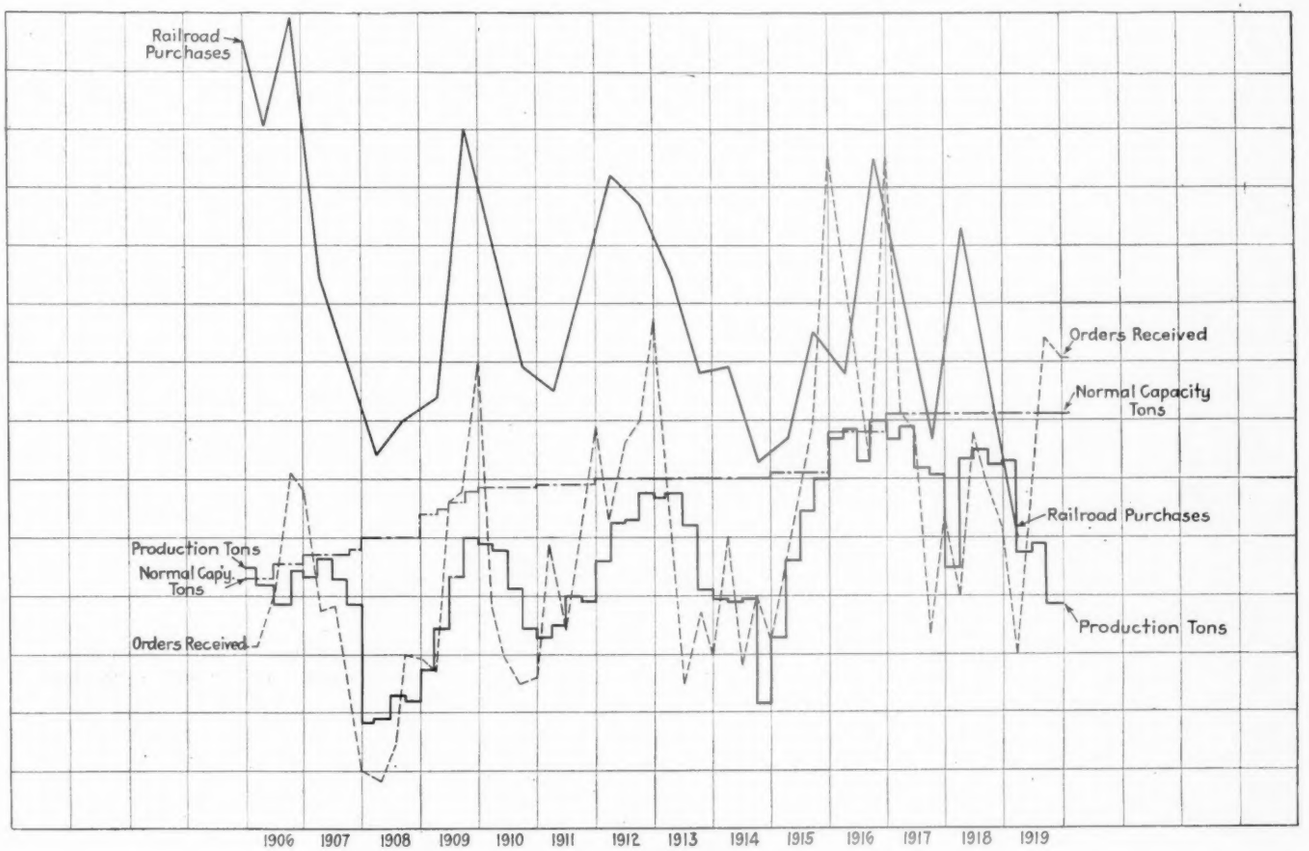


Fig. 9—Steel Production as Affected by Railway Purchases

The relation between railway purchases, orders received, total production and normal capacity in tons, in the experience of the United States Steel Corporation from 1906 to 1919. The railway purchases curve keeps close company with the orders received curve and in some instances displays the phenomenon of preceding it in upward or downward movements. This is true of the drops in 1909 and 1912. The production curve follows the ups and downs of the railway purchases curve throughout the chart.

main idle for much of the time. The total loss from the strikes of the year 1919 has been placed as high as $2,000,000,000. It is possible that the losses due to shutdowns caused otherwise than by strikes would reach a figure equally high.

Can Anticipate Needs

Speaking of the need for stabilized railway purchases, President Alba B. Johnson in an appendix to a statement made in August, 1919, before the House Interstate Commerce Committee, said:

"Some citizens bite this idea to see whether it is bogus. They inquire with a quizzical smile why it is only the railroads that should buy in dull years. What, they ask, is to prevent every kind of business from stocking up when the store is empty of customers? Why need there ever be any depression? The truth probably is that if railways and other improvements. Mr. Hanson on June 30, 1919, in answer to a letter from the Railway Business Association, wrote:

"We have held back street improvements, which are paid for by special assessments, for four years, making it possible for us to embark at once upon a career of money-spending in necessary public work. There are, as far as I know, very few people idle in Seattle today, not nearly as many as were idle before the war and during normal times."

Employment of Labor

Steady employment, the committee report says, "is the most essential element to the welfare and contentment of the worker."

"Undoubtedly periods of depression in the past have furnished labor with a very sound basis for some of its demands," the report continues, "and your committee is of the opinion that some reasonable stabilization of employment and

labor is essential to a reasonable contentment and satisfaction on the part of the great mass of workers, to a sound public sentiment and to the welfare of the nation and the maintenance of our representative form of government."

vantage of their opportunities, is recommended by the committee. This is applied both to surplus earnings which may be used for deferred maintenance, charged as operating expenses, and income available for interest and dividends, as

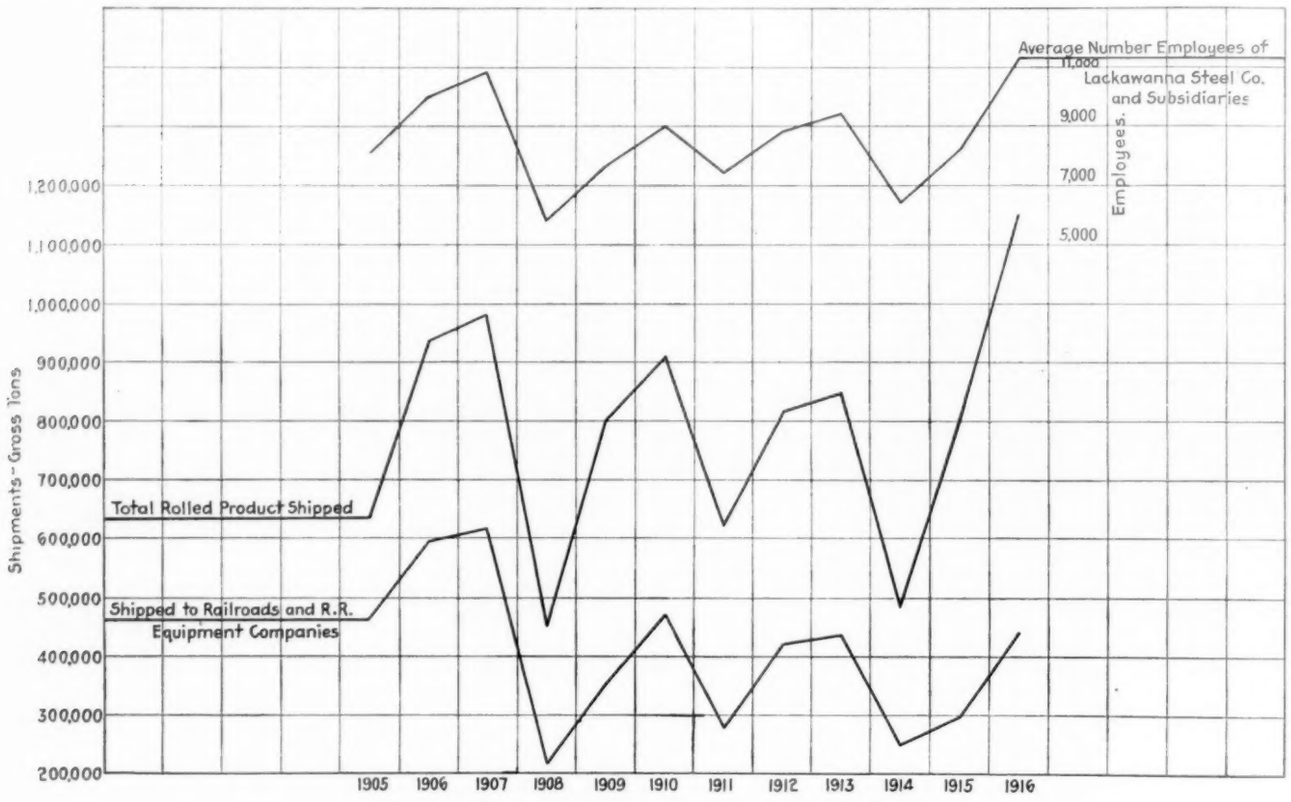


Fig. 10—The Experience of a Large Steel Producer

The experience of the Lackawanna Steel Co. from 1905 to 1916 in the relation between the number of men employed, total shipments of steel and shipments to railways and railway equipment companies. The chart shows a direct correspondence between the three curves in all their upward and downward movements. In the great slump of 1907-1908 the decline in railway purchases is 64 per cent and the decline in total purchases as close to this as 54 per cent.

Surplus Earnings and Income

Financial provision in times of large earnings, to the end that in dull periods the roads may be in position to take advantage of their opportunities, is recommended by the committee. This is applied both to surplus earnings which may be used for deferred maintenance, charged as operating expenses, and income available for interest and dividends, as a basis for investors' confidence and the flotation of securities at favorable times, the capital thus obtained to be put into additions and betterments when a dollar will go farthest.

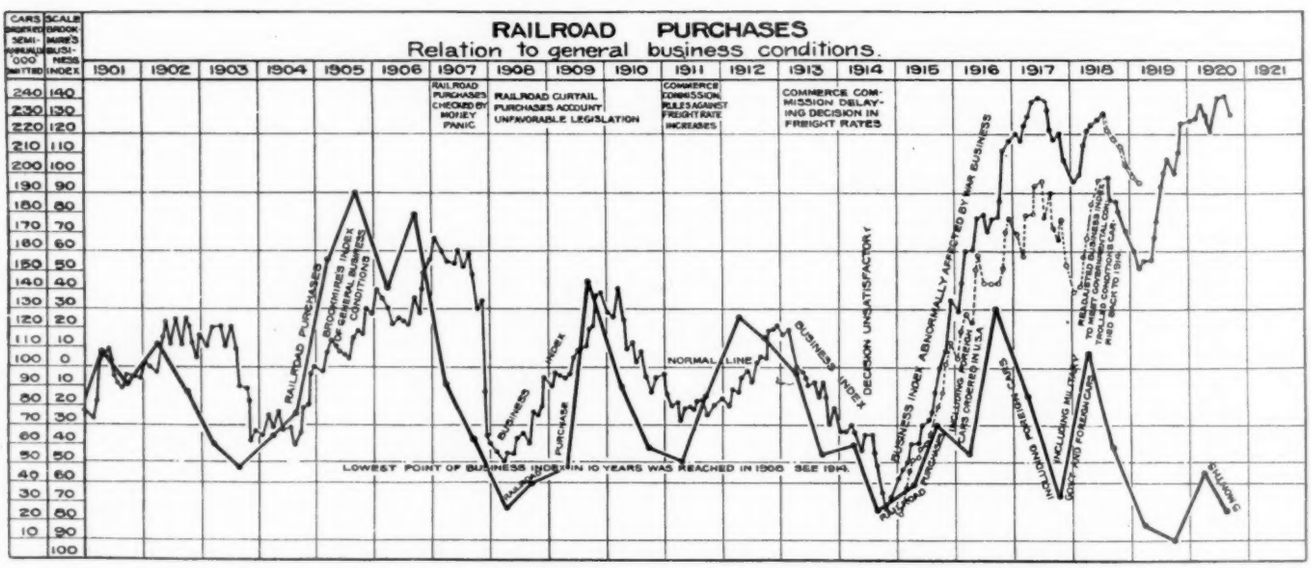
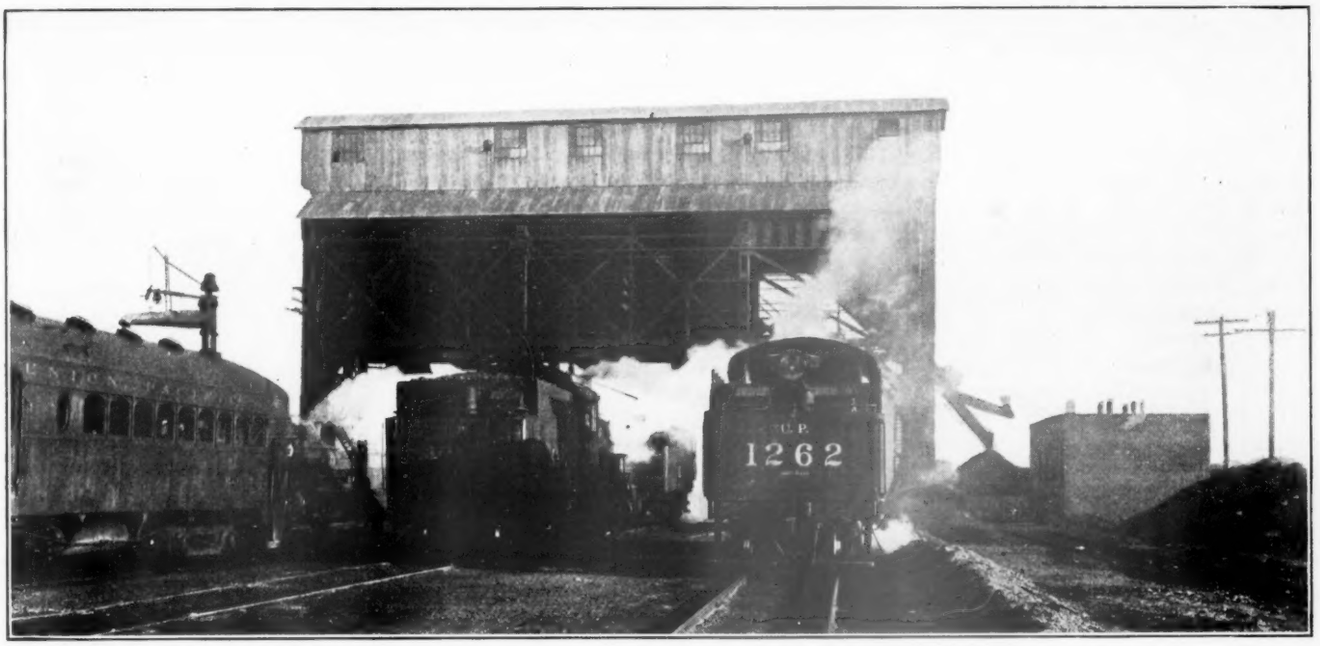


Fig. 11—The Relation of Railroad Purchases to General Business Conditions

This chart compares volume of railway purchases (typified by cars) with general business conditions (reflected in Brookmire's Index, compiled from ten outstanding factors). For the years 1901 to 1920 inclusive the persistent tendency is that when railway purchases are large this factor retards and mitigates a general slump or accelerates and reinforces a general revival. E. B. Leigh, who prepared and keeps this chart up to date, is of opinion that railway purchases when large not only accelerate and reinforce general revival but precede and initiate it.



What Additions to Physical Property Are Necessary?

Little Increase in Traffic Possible Without Betterments in Terminals and Other Facilities

CAR SHORTAGE, like anæmia, is a symptom common to a number of basic ills. In the absence of other related facts, it is therefore difficult to tell which one of them is responsible. Anæmia may be the result of inadequate nutriment, a defective circulatory system, or improper heart action. By the same token, a car shortage may result from an insufficiency of cars, inadequate trackage, a lack of motive power, or all possible combinations of these defects. No matter how plentiful the cars, they cannot be delivered if the tracks over which they must be operated are congested, or if the locomotives which move them are insufficient or are in poor shape for want of proper care.

In view of these fundamental facts, it is patent that any case of inadequate service must be subjected to most exacting diagnosis if the conditions responsible are to be determined accurately. There are cases where a car shortage may be relieved as much if not more by providing more or better locomotives or more trackage and other auxiliary facilities as would be made possible by the purchase of additional cars.

Following the return of the roads to private control in the spring of the past year, the managements were confronted with an unprecedentedly large freight traffic and realizing that private control was on trial, they exerted every possible effort to handle the traffic offered with the facilities at their disposal. As a consequence they succeeded in handling a greater freight traffic than was ever moved before in an equivalent period. In August, 1920, this reached a maximum of 42,706,830,000 net ton-miles.

CONSIDERABLE ADDITION to track mileage and increase in facilities for the care and repair of locomotives is necessary before the roads can be expected to effect appreciable improvement in car movement.

Large expenditures must be made for more adequate engine terminals, coaling stations and more satisfactory water supply.

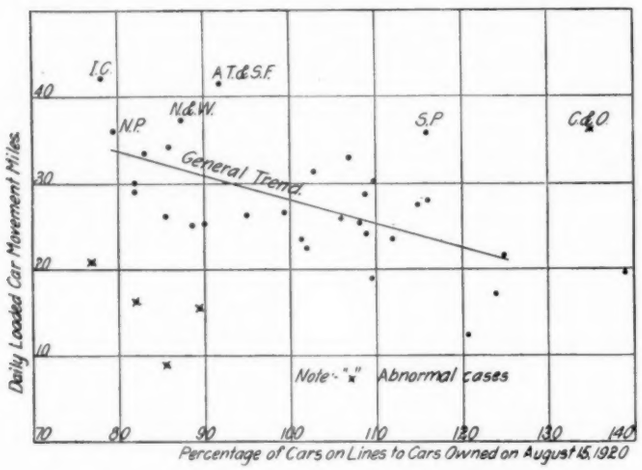
Improved yard facilities, side track extensions, grade separations, deferred bridge renewals, and new passenger stations will also require large sums.

The above figure is virtually the product of the number of cars loaded, the distance that the cars are moved each day and the number of tons of freight loaded in each car. Through the agency of the Association of Railway Executives and the American Railroad Association extreme pressure was imposed on the roads to exert every possible effort to secure a maximum loaded car movement, and there is reason to believe that the managements all entered fully into the spirit of the campaign to this end. However, the results secured differed widely. Some roads moved cars over 40 miles per day; others were unable to move them over 12 miles.

There is no doubt, a considerable variation in the efficiency of the supervision or in the *esprit de corps* on the various roads, but unquestionably a greater difference arises from local business conditions and the physical characteristics of the lines. Short terminal roads obviously will not make as good showings as long lines with simple terminal requirements. Another reason for this disparity of results may be illustrated by the chart showing the average daily car movements of 38 railways in various parts of the

country. In this chart the car movement for the month of August, 1920, is shown in relation to the percentage which the number of cars on each road on August 15 bore to the total number of cars owned by that road. In other words, the chart shows how the relative number of cars on the lines affects the loaded car movement. While this relationship is obviously influenced by a great many other conditions, the chart shows that generally better results in car movement were obtained on roads having a smaller number of cars on their lines than they own.

Considered in other ways, the chart indicates that some railroads have reached a limit in car handling capacity, and must of necessity make appreciable additions and improvements to facilities before they can hope to handle a larger



Approximate Relation of Car Supply to Car Movement

volume of traffic expeditiously. Conversely, the roads which have made the best showings in moving cars, taking due account of peculiar local conditions, are those which have been forehanded in their expenditures for additional trackage and terminal facilities.

While the roads have been successful in increasing the volume of traffic handled through the more intensive use of the facilities at their disposal, the above analysis demonstrates that further progress, insofar as it concerns the daily loaded car movement, is contingent upon additions to the fixed property. As one railroad president has recently expressed it in referring to the requirements of his own road, "We are obliged to spend about $1,000,000 each month whether we want to or not to measurably keep up with the procession."

Another factor which has played no small part in enabling the roads to handle a large traffic with the existing facilities has been the heavy car loadings. The increase in car loading during the past 12 years is illustrated in the chart which shows the increase in the average car loading each year in relation to the increase in the average car capacity during the same period. A separate portion of this chart shows the percentage relation which the average car loading bears to the average car capacity. From this it is seen that whereas the average car loading was about 60 per cent of the average car capacity for the 8 years, 1909 to 1916, inclusive, it has been possible to obtain loadings of nearly 70 per cent of capacity during two of the last three years.

Car loading will fall off during every period of light traffic, but the pressure for heavy loading can be renewed whenever the demand for cars exceeds the supply. There is, however, little hope for much further increase in the load per car other than that to be obtained as a consequence of increase in car capacity. It is noted on the chart that there has been only a small increase in average car loading during the past three years. However, it must be remembered that the results for 1918 were obtained very largely by the drastic regulations imposed on the use of cars at that time and the fact that the average was influenced largely by an unusually heavy traffic in bulk commodities in car load lots. Therefore the record obtained during the present year in the absence of war restrictions represents what could be done by the most strenuous efforts of the roads.

It appears, in consequence, that capacity for additional railway traffic must be obtained through an addition to the fixed properties that will permit of the movement of a larger number of cars. This immediately raises a question as to the distribution of funds appropriated to the various items making up the physical properties. In other words, it is of interest to know how the expenditures are to be divided among such items as additional main tracks, yards, engine terminals, sidings, station buildings, etc. One measure of this distribution is afforded by the manner in which the United States Railroad Administration expended the sum of $541,000,000 appropriated for roadway and track improvement. A study of these allotments shows the following proportionate expenditures: additional main tracks, 10 per cent; yard tracks and sidings, 20 per cent; station structures, 6 per cent; shops and engine terminals, 15 per cent; branches and extensions, 6 per cent; with 40 per cent for miscellaneous items. Estimated expenditures by the railroads during 1920 indicate an almost identical distribution except that yard tracks and sidings were allotted only about 15 per cent and extensions only 2 per cent.

Another measure is afforded by the analysis made in the six billion dollar issue of the *Railway Age* of January 1, 1920, of the requirements of the railroads for additions and betterments during the three years beginning on that date. This analysis allotted 19 per cent to additional main tracks, 23 per cent to yards and sidings, 10 per cent to station structures, 8 per cent to shops and engine terminals, 15 per cent to branch lines and extensions and the remaining portion for miscellaneous purposes.

The difference between the results of these two analyses is readily explained. In general the additions and betterments undertaken subsequent to 1915 have been such as were designed to expedite traffic rather than to reduce the cost of operation. Moreover, they have generally comprised items of limited scope that could be carried out quickly so as to obtain the benefit of their completion as soon as possible. Instead of building large new yards, the roads have been adding tracks to existing ones. New passing tracks have been built or old ones extended. Second tracks have been added where the work was light rather than in locations requiring heavy work. The estimates in the six billion dollar issue, on the other hand, presume a broad construction program designed with a view to permanent results both in the handling of additional traffic and the reduction of operating expenses.

Motive Power Facilities

The forcible arguments for the need of additional engine terminal and shop facilities which were imposed on the roads during the winter of 1917-18 resulted in an intensive campaign to provide more adequately for the care and repair of locomotives. Engine terminal and shop construction was particularly intensive on the roads east of Chicago, but the Union Pacific may be cited as an example of a western road which has recently carried out a large renewal and enlargement program to this end. A study of construction news items during the past few months shows a preponderance of engine terminal items, indicating that these facilities still maintain the important place which they have held in the budgets for the last three years. One of the largest improvement items, that for the large new locomotive repair shop

for the Santa Fe at Albuquerque, N. M., indicates that the need for additional repair facilities is by no means fulfilled and that shop improvements in general require plans of broad scope involving considerable outlay.

Engine terminals often permit of the addition of stalls to existing houses so that the new facilities are made available at a minimum outlay and after but a short construction period. In considering the character of improvements to be made in the immediate future, it must be remembered that while many large new terminals were built during the last three years the pressure for emergency construction was particularly severe, so there is reason to believe that these minor additions to the older existing plants have already been carried out in the majority of cases where such extensions were feasible. Consequently, projects to be taken up in the future must consist more largely of new layouts or extensions to relatively new plants.

This conclusion is also borne out by the fact that obsolescence plays an important part in the renewal of engine terminals. There is a limit to the extent to which roundhouse stalls may be lengthened and turntables replaced to provide for the larger locomotives now to be accommodated. Also many terminal layouts are in such cramped quarters

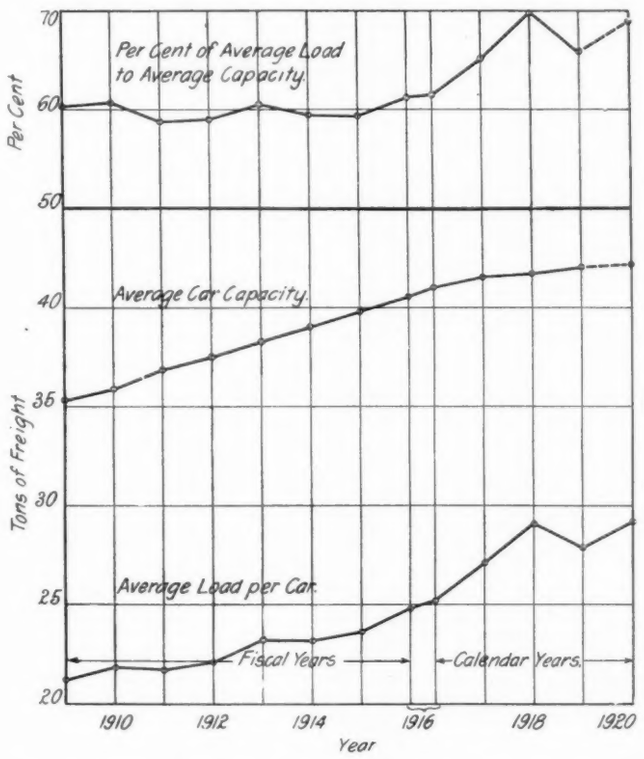


Fig. 2. Chart Showing Relation of Car Capacity to Car Loading

that the addition of new or longer stalls becomes impossible. But even more important are the practical limitations imposed on any attempt to modernize an old layout. An antiquated terminal does not lend itself to alterations that will permit of the application of modern tools, lighting, ventilation, heating, inspection, and other items that go to make up the character of plant necessary for the expeditious handling of locomotives. Consequently, the need for improved terminal facilities is far greater than that to be estimated merely by comparing the number of engine stalls with the number of locomotives to be handled.

Two other elements of the fixed property are closely related to the motive power service, namely, coaling stations and water supply. Reports of contracts recently awarded include many new coaling stations with storage capacities ranging from 300 tons to more than 1,000 tons. Here again the question of obsolescence as well as inadequacy plays an important part. The high cost of labor places a premium on the use of equipment that is as nearly automatic as it is possible to make it.

Water supply is closely related to the growth of railway traffic. A plant that was adequate for a daily traffic of 80,000 gross tons cannot supply sufficient water for a train movement aggregating 160,000 tons. The Illinois Central, which has been a leader among railroads in keeping abreast with traffic requirements, has given water supply particular attention. Another element to be considered in this connection is the treatment of water in roadside plants which has undergone a revival during the last four years. Enough time has now elapsed for the development of data demonstrating the results gained from these installations and should lead to considerable expansion in the use of the water softening plants.

Yards and Terminals

There is no question but that the terminal, speaking in the sense of yard trackage, has been and continues to be the neck in the bottle of railway transportation. Even congestion of main tracks can frequently be ascribed to the inability to receive trains promptly at terminals. Generally speaking, yard tracks are being used more intensively than any other portion of the railway plant and as a consequence, there is practically no reserve capacity for periods of extraordinary traffic or reductions in the effectiveness of the operating forces such as took place in the course of the outlaw switchmen's strike last spring. The amount of money expended for additional yard tracks and sidings has been the largest item in roadway expenditures, and will no doubt continue to absorb a large portion of appropriations. The indications are that, as in the past three years, this money will be devoted largely to minor additions here and there for the purpose of correcting the defects or deficiencies in existing yards, or for the construction of relatively small new terminals. It is interesting to note in this connection that work on only two freight terminals of first magnitude was undertaken during the three past years. In the New Haven's Cedar Hill yard the work is only partially complete, while that on the Illinois Central's Markham yard was suspended soon after starting.

Belt line construction of the nature carried out by the Chicago & North Western at Milwaukee and Chicago in the period just previous to the war has been conspicuous by its absence, and a number of such projects postponed as a consequence of the war must soon come up again for consideration. As a single instance may be mentioned the proposed belt line of the Great Northern around St. Paul. One item of considerable promise is that of flood lighting of new and existing yards as a means of expediting operation, cutting down damage and discouraging pilfering. Yard improvements form an important part of the current budgets.

Multiple Main Tracks

A discussion of the terminal situation is not complete without reference to tidewater and lake terminals for the trans-shipment of freight from cars to ships or vice versa. The Lehigh Valley recently commenced work on an enormous terminal of this character on New York Bay, while the Central Railroad of New Jersey has under consideration a $15,000,000 bridge project across Newark Bay which is designed primarily for the development of waterfront facilities.

Only a few railroads have undertaken second track work on a comprehensive scale during the last five years. The extensive improvement programs carried out by the Southern

and the Union Pacific during this time have been so unique that they stand out in sharp contrast to the policies pursued by the other roads. In each case the need of the improvement was great and the corresponding benefits derived from the completion of the work have been in proportion. The Illinois Central and the Erie have done work of a similar nature although on a smaller scale, but on most other roads the only projects carried out were those entailing relatively light construction. Current budgets contain a few items for immediate consideration, but not in proportion to the amount that must be done eventually, since it is not within reason to presume that the few roads which have undertaken double track work on a large scale in recent years are the only ones which are in need of additional facilities of this character.

Bridge Construction

Bridge renewals are closely related to the problem of increased traffic carrying capacity of a railroad because of the limitations which old bridges place on the use of heavier locomotives. Any project for the use of heavier power on a railroad must usually carry with it plans for strengthening or renewing bridges on the lines on which the new locomotives as well as those on which the ones they replace are to be used. Bridge work on the railways, especially in structural steel, has been largely restricted in recent years. This tendency, in recent months, has not been limited to the railroads as indicated by the fact that orders taken by the steel fabricators during the last six months represent a tonnage ranging from 25 per cent to 60 per cent of the shop capacities. This means that a large number of renewals have been deferred which must be carried out eventually. At the present time a considerable number of railway bridge projects are under consideration which will take definite form just as soon as reasonable financing appears feasible.

A considerable volume of railway bridge work is concerned with the elimination of existing timber bridges or trestles, either by the use of steel or concrete structures or embankments with small culvert openings. Such projects always form an important item in railway budgets and the current budgets are no exception in this regard. Some idea of the eventual requirements of bridge work may be gained from the fact that three of the more prosperous roads in the middle west have permanent structures in only 35 per cent of their bridge openings, while there are roads in the south and southwest with as little as six per cent in permanent structures.

Other Classes of Improvement

Thus far the discussion has been limited almost entirely to additions and betterments to the fixed property which are designed to secure more expeditious movement of traffic. Owing to the fact that expenditures for improvements on the railways have been restricted very largely to this end, there has been an enormous accrual of deferred expenditures for improvements which the railroads are called upon to make for other reasons. Chief among these are those which will result in increased economy of operation. Under this head are included grade and line revision projects. Possibilities for obtaining equivalent results through the use of heavier power or through electrification have served to place a somewhat different aspect on the problem from that which it had in the past. Nevertheless, it is clear that much work of this character must be done.

Of the same nature are projects for the readjustment of engine district mileages for the purpose of reducing the overtime in train service. Studies for such changes have been carried on ever since the passage of the Adamson law, but thus far progress in this direction has been made only in cases where terminals could be abandoned because of obsolescence or inadequacy. As a case in point may be mentioned the New Buffalo (Mich.) engine terminal of the Pere Marquette which replaces an outgrown utility at Benton Harbor.

Still another class of improvements are those which the railroads must make because of the pressure of public opinion. These include passenger stations, grade separations and other public improvements. The president of one large system recently estimated that the aggregate deferred expenditures to this end on his line amounted to $10,000,000. Items of this character were specifically excluded by the special committee of the Association of Railway Executives last summer, when presenting its recommendations to the Interstate Commerce Commission for loans to the roads from the revolving fund, but the perusal of construction columns and current budgets indicated that the demand for expenditures of this kind is being felt.

One especially large field for expenditures is that of grade separation. While this has been carried on extensively in the past within the corporate limits of cities, the nation-wide highway construction which is now in its inception, coupled with the increasing menace of the automobile accident, is sure to exert a powerful pressure for work of this character in rural communities.

Photo by courtesy of the Mississippi Warrior Service

One of the New Developments in Inland Waterway Transport

Putting on the Finishing Touches at Eddystone

How the Need for More Motive Power Will Be Met

New Locomotives, Remodeled Old Locomotives and Improved Operation of All Locomotives Imperative

ONE YEAR AGO the railroads of this country were still operating under federal control although living in the anticipation of an early return to private management. Throughout the period of government control, the impression undoubtedly prevailed that the condition of motive power had been allowed to deteriorate and that with the return to private management the railroads would be faced with the necessity for doing much toward the rehabilitation of the motive power. This impression was further substantiated by the fact that the government did not buy nearly as many locomotives as had been purchased in previous years and it was confidently expected that, again in possession of their properties, the corporations would immediately place some very large orders for locomotives.

The *Railway Age,* in reviewing this subject a year ago, estimated upon the basis of statistics relating to the growth of traffic and the increasing demands for motive power since 1905 that no less than 11,566 new locomotives would be required within the next three years. It is surprising to learn, therefore, that less than 1,700 locomotives were ordered during the past year.

The most obvious explanation for a curtailment in locomotive orders at this time is the difficulty experienced in securing funds for the immediate purchase of new locomotives or for remodeling old ones. We are, therefore, confronted with the fact that the orders during 1920 that were most conspicuous for their size in proportion to the equipment owned were not confined to those railroads that have the most ample resources. Orders placed by the Chicago, Milwaukee & St. Paul will add more than five per cent to the total number of locomotives owned by that railroad at the time the orders were placed. The Missouri, Kansas & Texas and St. Louis-Southwestern are both adding approximately eight per cent to the number of locomotives owned and, as the tractive effort of these new locomotives considerably exceeds the average of the locomotives already owned, the effective motive power on these railroads will actually be increased by a considerably greater percentage. In this connection, however, the most notable order of the year was placed by the Western Maryland for 40 heavy Consolidation locomotives representing an increase in the number of locomotives on that railroad of over 16 per cent.

During the year the New York Central Lines not only bought more locomotives than any other system, but placed these orders immediately after the termination of federal control. The following is quoted from a statement which this

> THE PRICES paid for locomotives in 1920 are the highest on record, but the increased freight and passenger rates and the volume of traffic established new standards for the earning power of individual locomotives.
>
> It is the earning or the saving power rather than the first cost that determines the dividend. Hence some locomotives purchased in 1920 may prove cheaper than the same locomotive purchased later at a lower price.

railroad recently issued to the public in regard to its policy.

"When the government turned the railroads back to their owners, experts computed that approximately $500,000,000 worth of new equipment was the imperative need of the hour. The New York Central Lines immediately placed their $53,000,000 equipment order covering 196 locomotives, 265 passenger cars and 11,244 freight cars. Last March, assurances were given the shippers and the public generally that no time would be lost in meeting the needs of the service, in rehabilitating existing equipment and purchasing new rolling stock. The New York Central Lines are keeping faith."

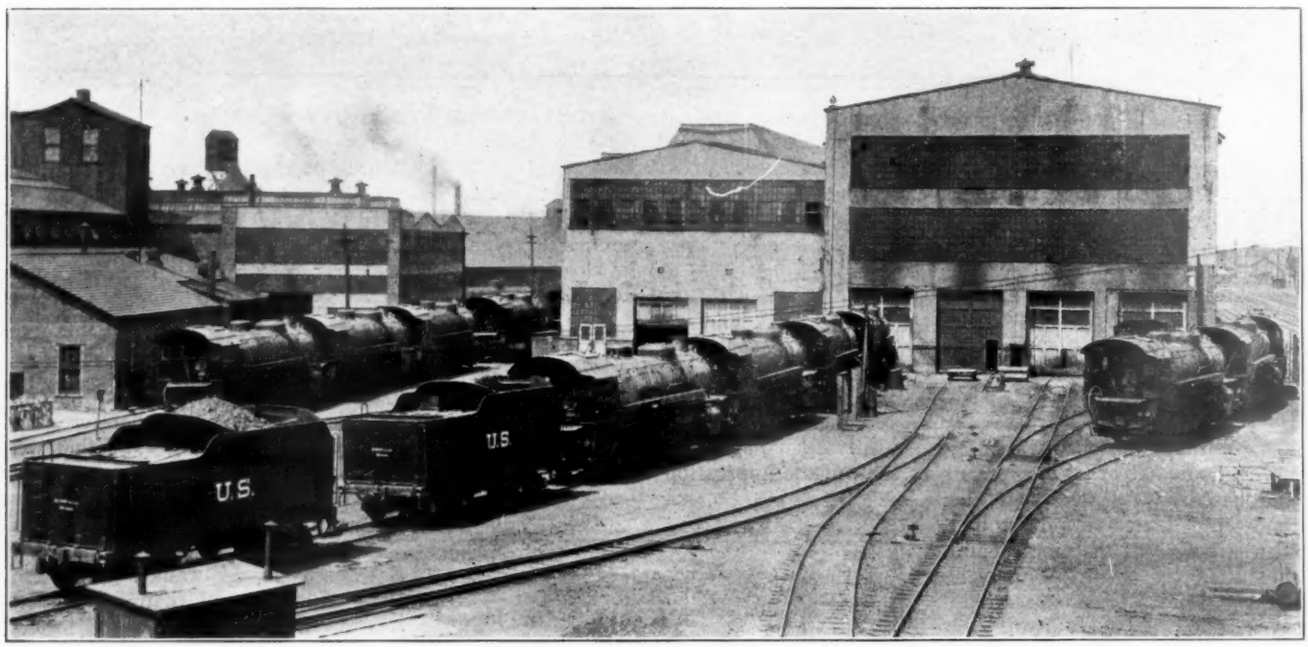
Additional Motive Power Will Be Needed

It is true that the current depression in business has reduced the demand for motive power and that if this depression were to be prolonged indefinitely the railroads would have little need for additional power at this time. But it is very much safer to gamble on a speedy return to business activity than upon continued depression. It has been an invariable rule among successful financiers to place absolute dependence in the future of this country and there is no safer assumption in the world than that that growth and the traffic demands of this country will continue to expand. Every cloud in our financial past has been found to have a silver lining and in planning for the future of the railroads it would be a grave mistake to be swayed from a constructive program of improvements by the immediate business outlook no matter how dismal.

Within the last ten years the annual revenue freight tonnage and passenger traffic has increased to the extent of 43 per cent. Business men usually figure upon an average annual increase of 4 per cent to meet the requirements resulting from a normal increase in the growth of this country and any railroad that is in a position to benefit in proportion to the average increase in business throughout the country must either look forward to increasing its capacity each year by at least that extent or to relinquishing some of the business which should normally come to it.

During the year the Illinois Central ordered 100 Santa Fe type freight locomotives, 25 Pacific type passenger locomotives and 25 Eight-wheel switchers. This represents an addition of 10 per cent to the number of locomotives in service on that railroad at the commencement of the year and, because of the high tractive power of these new locomotives, a considerably greater relative contribution to the effective motive power on that railroad. The acquisition of this power is all the more remarkable because at the beginning of the year 87.5 per cent of the locomotives on the Illinois Central railroad were reported in serviceable condition. The significance of this will be more fully appreciated when it is understood that at the same time only 75.1 per cent of all the locomotives on Class I railroads were reported as being in serviceable condition.

Is it not safe to assume that the very liberal policy pursued by the Illinois Central toward motive power expenditures has been in no small measure responsible for the acknowledged efficiency of this railroad and its popularity among shippers, particularly in competitive territory? It is also pertinent to point out further in connection with this order that no matter to what point business may decline within a year following the purchase of these locomotives, the railroad will have had the use of the locomotives in the meantime. Moreover, if these locomotives are used to replace less modern and less powerful locomotives, the railroad will doubtless save enough money in operating expenses thereby to more than discount any price drop in the cost of locomotives that might reasonably be anticipated within the coming year. The same line of reasoning might be applied to the purchase of locomotives this year rather than a year hence. In fact, the "Buy Now and Ship Now" movement to which this issue is dedicated, has a particular significance when applied to locomotives.



Busy Days at Lima

Analysis of the Situation

The following statement is contributed to the *Railway Age* by one of the best informed motive power executives in the country and may be accepted as an authoritative analysis of the current motive power situation.

"Until recently, when business rapidly declined, there has been a serious shortage of locomotives, due first to the large reduction in buying during government control, and second to the rapidly increasing cost of new locomotives in the past three years which has made it exceedingly difficult to finance new purchases.

"New power should by all means be added when possible

to finance the purchase but the increasing difficulty of financing such purchases demands as never before increasing the efficiency of the present equipment and getting maximum efficiency out of the present locomotives.

"During government control and up to the late Fall it was difficult to secure competent help to maintain the locomotives on the average railroad in proper physical condition. When labor became more plentiful the rapid decrease in gross earnings of the railroads made it necessary to reduce operating expenses, which was immediately reflected on most railroads in upkeep of the power.

"The tremendous overhead expense now carried by the railroads due to the concessions granted employees during federal control makes it practically impossible to reduce operating expenses in conformity with the rapid decrease in gross earnings."

Better Locomotive Terminals a Factor

The *Railway Age* has said too much in regard to locomotive terminals throughout the past year not to recognize at this time the important fact that an improvement in terminal facilities tending to reduce the percentage of time a locomotive is held out of service is directly equivalent to adding a corresponding percentage of power to its equipment. If a railroad operating 1,000 locomotives an average of 10 hours daily could, by means of better terminal or shop facilities, increase this average to 11 service hours per day, it would serve the same purpose as the addition of 100 locomotives of similar type to its equipment. The motive power problem is by no means confined to the purchase of new locomotives nor to remodeling old locomotives, it is equally concerned with the intensive operation of existing power.

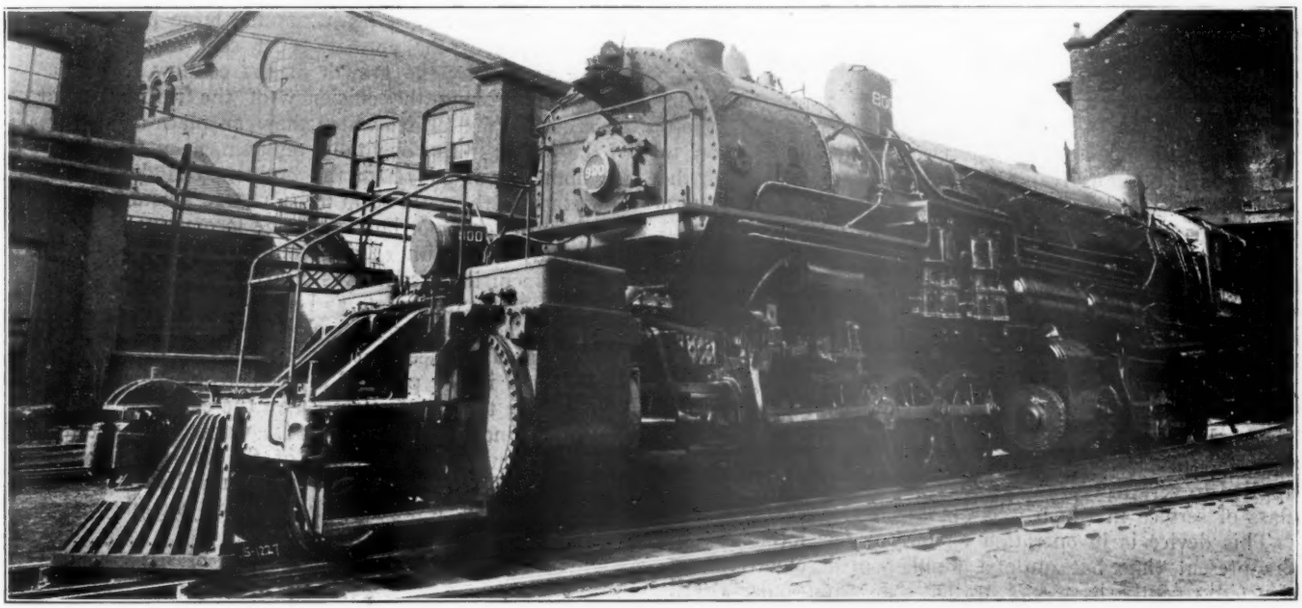
Any locomotive device that serves to extend the mileage between shoppings or any terminal facility such as a bigger ash pit or a better roundhouse that makes it possible to turn locomotives more rapidly adds something to the available tractive power which the railroad needs. Under many circumstances an investment in such facilities will effect a greater return in available tractive power than an investment of equal magnitude in new locomotives.

Despite the acquisitions of new locomotives and an increase in the average tractive power of all locomotives, the results for the month of October in comparison with previous years as shown in the following table are disappointing and clearly demonstrate the need for the more intensive operation of locomotives:

	1918	1919	1920
Total number of locomotives reported in freight service, month of October....	29,224	30,184	34,257
Gross ton-miles, month of October (thousands)	39,621,923	40,166,632	42,562,685
1,000 Gross ton-miles handled per locomotive	1,355	1,331	1,243

This statement, showing an actual decrease in the average gross ton-mileage handled by each locomotive reported in freight service, is eloquent proof of the necessity for those facilities which are designed to keep locomotives in service a greater percentage of the time. In this connection the statements required by the Interstate Commerce Commission showing the percentage of service hours for all locomotives will prove interesting reading when published and it is to be sincerely regretted that as a whole, individual railroads have not shown a disposition to compile these figures voluntarily nor use them locally to the best advantage.

Another interesting statement in this connection, which tends to further emphasize the necessity for better locomotive terminal and shop facilities, relates to the percentage of locomotives reported in serviceable condition as shown in the following:



Virginian Mallet Nearing Completion at Schenectady

	Nov. 30, 1918	Nov. 30, 1919	Nov. 30, 1920
Freight locomotives on lines reporting....	28,997	29,801	35,447
Passenger locomotives on lines reporting..	13,219	13,676	14,253
Switch locomotives on lines reporting....	14,799	15,214	13,880
Total locomotives on lines reporting.....	60,172	61,613	63,580
Number in serviceable condition.....	47,462	46,417	48,747
Per cent serviceable.....	78.9	75.3	76.7

Most Obvious Way to Increase Capacity

In many cases the most obvious way to meet the demand for increased locomotive capacity has been found in remodeling old locomotives and the application of approved economy and capacity increasing devices to these locomotives. This is particularly applicable where the restrictions on locomotive weights are such as to limit new locomotives to weights not exceeding that of old locomotives susceptible to modernization and where the traffic is of a character that does not permit of further increase in train loads. Where these conditions obtain it has been found possible to remodel many old locomotives so that they are in every way equivalent to the most modern power applicable to the line, at less than half the cost of new locomotives.

The most notable accomplishment in this direction during

the past year has resulted in the reconstruction of cross compound Consolidation locomotives into strictly modern superheater locomotives of the same class on the Boston & Maine. This railroad is also planning the reconstruction of old Twelve-wheel locomotives into Eight-wheel switchers of modern design and has even extended its modernization program to include Eight-wheel passenger locomotives with 18 in. by 24 in. cylinders to which superheaters are being applied.

There is still a disposition in some quarters to strip the locomotive of economy and capacity increasing devices in order to cut down its first cost to the railroad. When it is clear that an addition of 10 per cent to the first cost of a "plain engine" may suffice to equip this locomotive so that its capacity or efficiency is increased 20 per cent the folly of buying locomotives on the basis of low first cost should be obvious. As a whole, locomotives purchased in 1920 represented the best in design and were equipped with as full a complement of auxiliary apparatus as can be properly maintained with the present shop and terminal facilities. A larger proportion of Santa Fe type locomotives and a smaller proportion of Mallet type locomotives were built than in recent years.

New Locomotive Characteristics

No new locomotive types made their appearance during the year but several interesting and promising developments were initiated. The new Decapod locomotive now in service on the Pennsylvania is a conspicuous addition to the art and the Consolidation locomotives ordered by the Western Maryland will doubtless embody certain features that will recommend this type to further consideration. The most notable contribution to the development of the locomotive during the year was made in the direction of capacity increasing devices. For the first time new Mountain, Mikado and Santa Fe type locomotives were constructed with thermic syphons designed to add 10 per cent to the capacity of the boiler.

The locomotive booster made its appearance during the year and promises a remarkable increase in capacity when applied to certain types of motive power dependent upon the class of service in which it is operated.

This device is in operation on only a few locomotives at the present time but quite a number of locomotives constructed recently have had trailer axles and other details designed to facilitate the application of the booster at a later date. During the year feed water heaters were applied to Mountain type locomotives for the New York, New Haven and Hartford but locomotive feed water heating has not made as much progress during the year as might have been expected in view of the savings which would surely result from the more general application of this principle.

Year	Number of locomotives	Aggregate tractive power (1,000 lb.)	Per cent increase over 1910	Average tractive effort per locomotive	Revenue freight traffic (1,000 ton-miles)	Per cent increase over 1910	Passenger traffic (1,000 passenger miles)	Per cent increase over 1910
1910	58,947	1,588,894	..	27,282	255,016,910	..	32,338,496	..
1911	61,327	1,681,496	6	27,949	253,783,702	..	33,201,695	3
1912	62,262	1,746,964	10	28,634	264,080,745	3	33,132,355	2
1913	63,378	1,847,798	16	29,702	301,398,752	18	34,575,873	7
1914	64,760	1,931,954	22	30,420	288,319,890	13	35,258,498	9
*1915	63,850	2,014,202	27	31,546	276,830,000	9	32,384,248	..
*1916	65,021	2,075,520	31	31,921	343,099,938	34	34,213,596	6
*1917	63,828	2,145,698	35	33,617	365,771,825	43	39,476,859	22
*1918	64,410	2,196,648	38	34,104	401,946,000	57	42,566,343	32
†1919	64,869	2,303,950	45	35,517	365,000,000	43	46,202,827	43

*Classes I and II only.
†Class I only (estimated).

The greatest strides in American railroading have been accomplished by increasing the capacity and efficiency of the locomotive. How much remains to be accomplished in this direction is apparent from a comparison between the average tractive effort of all locomotives as shown in the above tabulation and the average tractive effort of locomotives now under construction.

In some instances, owing to the traffic conditions or restrictions placed upon wheel loads, the limit has already been reached, and in these instances the full modernization of existing power affords the only remaining field for improvement. But on a vast majority of railroads there is still the opportunity for replacing small power units with new locomotives that in some instances will add 50 or more per cent to the tonnage of freight trains or will eliminate doubleheading on passenger trains.

Outlook for the Future

Instances are not uncommon in manufacturing plants where the entire machine equipment has been scrapped to make place for new machines that would reduce the cost of manufacturing by 15 per cent. Opportunities for effecting greater economies than this through the replacement of old and obsolete locomotives with large modern locomotives everywhere abound; hence, it is reasonable to predict that locomotive orders must again assume large proportions, not only because of the normal 4 per cent increase that will be occasioned by the growth of the country but as a step toward improving the efficiency of the railroads and the character of the service which they can place at the disposal of the public. The inevitable replacement of wornout power is another item on which the builders can depend so that altogether there would seem to be a large amount of business which must sooner or later go to the locomotive builders.

A study of the underlying conditions that affect the cost of manufacturing locomotives clearly indicates the futility of hoping for any immediate and substantial reduction in locomotive prices applying to a volume of orders that is at all in proportion to the needs of the railroads. Labor costs figure prominently in the price of a locomotive and no one appreciates better than the railroad man the extent to which these costs have increased; first, because wages have doubled and second, because the efficiency of the individual worker is lower. While improvement may eventually be anticipated in this direction, it will hardly be rapid enough to manifest itself in any quick reduction in prices.

The Problem of Prices

Steel prices, comprising the principal material item entering into the cost of a locomotive, have fallen rapidly within the last few months and are still slightly above the levels established by the leading steel producer. There can be no question but that the Steel Corporation has made a sincere effort to stabilize steel prices and having adhered to these prices in a rising market will hold to the same prices in a falling market. Hence, while some shading of prices below these levels may be anticipated, it does not seem likely that with a large unfilled tonnage still booked at these stabilized price levels there can be any substantial reduction below these prices for some time to come. If locomotive costs are figured upon higher steel prices, they must be reduced; but, with the assurance that costs are based upon the prices established by the leading steel producer, no further reduction can soon be anticipated.

Transportation charges affecting both the raw materials entering into the cost of a locomotive and the finished product must also be taken into account in any discussion of locomotive prices and the railroads would certainly be the last to admit that there can be any reduction in these charges. The problem of prices is secondary to having the new equipment that is needed, when it is needed. Hence, it may be repeated, the "Buy Now" slogan applies with particular force to locomotives.

Railroad Yards at Toledo. Photo from Ewing Galloway

Little Progress in Reducing Equipment Shortage

Meagre Purchases During 1920. Constructive Policy Must Be Adopted to Retain Public Goodwill

THERE WERE ONLY SIX WEEKS in 1920 during which there was not a serious shortage of freight cars. In the past four and one-half years there have been only three short periods when the railroads have had more cars than were required to handle the traffic. During the last few months of the war there was a slight surplus and in the slump directly after the Armistice there was a very large number of idle cars for six months. During the coal strike of 1919 the idle cars exceeded the deferred requisitions by a few thousand for one month, and in the last six weeks, since the recession in business has reduced the volume of traffic, the surplus has increased to over 100,000 cars.

There is only one other instance of a serious and prolonged car shortage in recent years; namely, in 1905 and 1906. The demand by shippers for more equipment at that time resulted in orders for 650,000 cars being placed in those two years. On the other hand, during the four years of equipment shortage, from 1917 to date, the orders aggregated only 309,406; the total for four years is less than one-half the number ordered in the two years cited above.

THE statement has been made that private management will fail because it cannot provide the capital required for new equipment. The advocates of government ownership will find some support for this contention in the record of car purchases during the past year. Despite the car shortage only 1,780 freight cars and 84,207 passenger cars were ordered in 1920.

Unless prompt action is taken, another serious shortage of equipment will occur when business again returns to normal.

The small volume of orders placed in 1916 was due to a variety of causes. When the car shortage first developed, the net earnings of the roads were higher than they had been for several years, equipment prices were not excessive and interest rates were low. Consequently, the number of cars ordered in 1916 was fairly large. In 1917 the price of steel increased greatly and this together with the preference given to the needs of the government reduced the volume of orders. When the roads were taken over by the government, plans were promptly made for the purchase of 100,000 cars. The delivery of these cars was delayed and no more orders were placed by the Railroad Administration during the 26 months of federal control.

Since the roads have been returned to the owners there have been various circumstances militating against a resumption of the normal volume of car purchases. Early in the year some of the stronger roads placed orders sufficiently large to increase their total freight equipment in proportion to the growth of traffic. The high interest rate, coupled with high prices, deterred many roads from buying cars. The revolving fund of $300,000,000 provided by the Transportation Act was intended to overcome this difficulty, and the Interstate Commerce Commission on May 21 authorized the use of at least $125,000,000 for the purchase of equipment. The act was amended on June 5 to extend the period of repayment from 5 to 15 years, thus making the condition much more favorable for the roads. However, the Treasury Department took advantage of a technicality to withhold the funds. The commission has authorized loans amounting to $118,621,385 as reported on November 24, but the loans actually made up to October 20 aggregated only $56,190,325.

Aside from the problem of financing the equipment, some roads originating little traffic have probably been led to postpone buying due to the fact that the per diem rate was unremunerative on the basis of present prices and the percentage of equipment off the home roads very high. During recent weeks the downward tendency of the prices of basic commodities has probably been principally responsible for the scarcity, not only of orders, but also of inquiries.

Temporarily the problem of furnishing equipment for shippers has been solved. The recession in business has caused a decrease in the freight traffic and at the beginning of the year there was a surplus of over 100,000 cars. But a car surplus in a time of depression has little significance. The roads cannot evade indefinitely the responsibility for furnishing adequate equipment for moving not only a nor-

mal traffic, but a reasonable overload. They cannot expect to retain the goodwill of the shippers unless they provide facilities for handling the traffic, not by emergency measures and constant delays due to car shortage, but with normal use of the equipment by the shippers and prompt attention to requisitions for cars.

During the major portion of the last four years the roads have not given adequate service. During federal control, shippers were induced to load more nearly to the maximum capacity and to release cars promptly. Since the roads were returned a similar campaign has been carried on, but as a regular policy shippers are not likely to take kindly to such measures as the use of a large amount of dunnage to insure maximum loading without any compensation or loading and unloading on Sundays and holidays, as has been advocated and practised in recent months.

The viewpoint of the shipper has been well expressed in the following words by John M. Glenn, secretary of the Illinois Manufacturers' Association: "The railroads want adequate compensation for carrying freight; the shippers feel that in return for the increased compensation the railroads have been accorded, they are entitled to cheerful, expeditious service. * * * The additional tonnage carried by the freight cars of this country this year has been largely at the expense of the shippers, who, in order to load their cars heavier, have been obliged to supply a greater amount of dunnage. * * * The consignee does not want a heavily loaded car unless he has a ready market for the commodities and he does not want to pay freight charges on a shipment that may exceed his immediate needs unless there is some inducement."

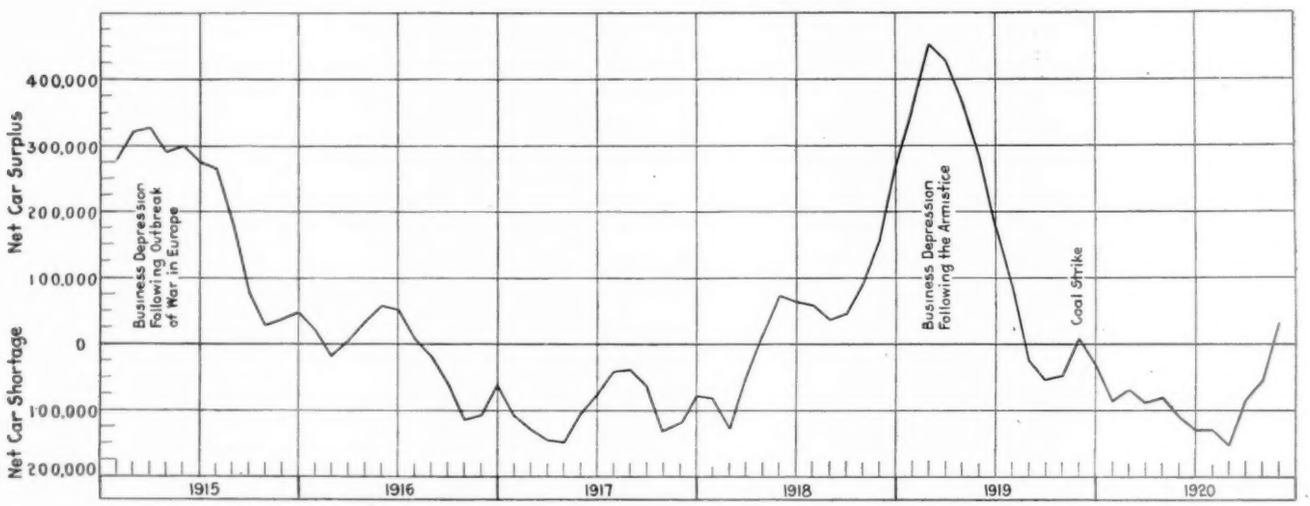
Viewed from the broad economic standpoint, the proposal to continue rationing cars is indefensible. Studies made in the bituminous coal mining industry show that when the car supply is 75 per cent of the requirements, the cost of production is 16 per cent greater than when all demands for cars are met. If the car supply is one-half normal, the cost of coal is increased 40 per cent. Car supply undoubtedly influences the cost of many other industries in a similar manner and the sum total of the bill which American producers pay when a shortage of cars exists would make up the cost of the additional equipment required many times over.

Bearing in mind that private operation cannot be a success unless it pleases the railroads' customers—the shippers—the question arises to what extent the need for equipment can be met by improved utilization of facilities and how many new cars will be needed. Each individual road has some local conditions to meet that will necessarily affect its policy in making equipment purchases. This article is confined to a discussion of the problem of car supply from the standpoint of all the railroads of the country considered as a system.

An analysis of the estimated requirement for freight cars was published in the *Railway Age* for January 2, 1920. It may be enlightening to review the conclusions stated in that article in the light of the results obtained during the past year. The principal points stressed in that article were as follows:

1—The freight traffic of 1918 although abnormally heavy was not in excess of what may be expected in the next two or three years. The average annual increase of revenue ton-miles is about 4.14 per cent.

2—The efficiency of utilization of cars as measured by the ton-miles per ton of capacity per year increases in times of car shortage and decreases when there is a surplus. As a yearly average, the ideal condition of no pronounced shortage or surplus is obtained when one ton of car capacity is provided for each 3,500 revenue ton-miles moved annually.



Net Freight Car Surplus and Shortage for the Past Six Years

(Normally a surplus of about 100,000 cars should be maintained to enable the railroads to fill requisitions promptly.)

3—On the basis outlined, the equipment required for three years was calculated. Allowing for deferred retirements and a surplus to take care of the peaks of traffic, the number of cars that should be purchased annually for three years was estimated to be 237,000.

Reviewing these conclusions with the operating results for 1920 in mind, brings out some interesting points. The traffic for the year on the basis of the statistics for the first ten months appears to be only slightly greater than was estimated. If business conditions return to normal, the record should be exceeded in 1921. The most important factor is, of course, the relation of car capacity to traffic, but the results contribute little that will either substantiate or modify the earlier figure.

During the summer and fall, new records for the net ton-miles per car day were established, but this was the result of extreme efforts of both the railroads and the shippers to overcome the car shortage. Heavy loading and quick release of cars both depend on the co-operation of the industries and the highest efficiency in the use of cars seems incompatible with accommodation to the shipper. It may be that in the future slightly better use of the equipment can be secured under all conditions. If this is the case, the demand

for cars will be reduced somewhat. This can only be determined when statistics of car capacity and freight traffic covering a period during which shippers were given normal service become available.

In any attempt to estimate the equipment needs of the roads during 1921, the general business situation must be considered. The present decline in the volume of business cannot continue for a long period. Expert economists have stated that the upward turn will occur in April and this agrees with the views expressed by many leaders of industry. As has already been noted, the traffic of 1920 was not abnormally heavy, and it may be exceeded in 1921. There was a serious shortage of cars last year, and there is only one way to avoid another shortage whenever there is a revival of business; that is, to BUY NOW.

There are several cogent reasons why the railroads should not defer purchases. Most important of these is a stabilization of business. Irregularity of employment is one of the great economic wastes of the present day. If the railroads go into the market now for a fairly large number of cars, the effect would be felt through many allied industries with a favorable reaction on the railroads themselves. The recent reductions in the price of steel furnish another argument for going into the market at this time. The prices of the Steel Corporation and the independent plants are now on the same basis which will probably be maintained for some time. Although the prices of the car builders have been based on the corporation's scale, the quotations for various types of equipment are approximately 10 per cent below the high point of 1920. If the car builders were assured a larger volume of business, the cost might be lowered still further. It may not be out of place to mention that the car building plants have been operating at only a fraction of their normal capacity and the railroads will be obliged to anticipate their requirements by several months, particularly in case there is a sudden demand for large amounts of equipment.

Those who contend that the railroads should stay out of the market at this time base their argument on the assumption that this would insure a more drastic price reduction. Recent developments indicate that prices will eventually drop still further, but from all indications temporary stability has been reached on the present level. It would be out of the question for the railroads to defer purchases until prices touch bottom. The increases to recent high levels were reached step by step for a period of five years. The return to the future normal will also occur step by step and will no doubt require a much longer time.

The rise in prices during the Civil War occurred in approximately three years, but the pre-war level was not reached again for fifteen years. Railroads must buy more cars before the bottom of the market is reached. The important question today is not how to buy at the lowest price. The gain or loss in revenue in a few months due to insufficient car supply may outweigh that many times. The important matter is to make sure that when the revival of business occurs, as it inevitably will in a short time, the railroads will be able to handle the traffic.

In the past, the railroad managers have pointed to the low rate of return as the reason for not furnishing the necessary equipment. The provision of the Transportation Act providing a fair rate of return on railroad securities, was intended to permit the roads to add to their inadequate facilities. There is only one way for the railroads to retain public goodwill. They must start now to buy cars in order that the industries of this country shall receive at the hands of the railroads the service which they need for efficient operation.

The Passenger Car Situation

One year ago a careful estimate was made of the number of new passenger cars which would be required to restore passenger service to a condition reasonably approaching that to which the American traveling public has been accustomed.*

The conditions assumed as reasonable were those existing during 1917, when each passenger carrying car carried an average load of 17.6 passengers. This was considered conservative, since during a period of nine years preceding the war the average passenger car load had never reached 16 passengers. On a hypothesis that the restoration was to take place over a period of three years, and after making allowance for deferred and future normal retirements as well as for prospective increases in traffic it seemed evident that some 8,000 cars would have to be purchased annually.

A review of the past year's developments indicates that, on the same basis, the requirements for new passenger equipment are even greater now than last year. Passenger-mile statistics for a group of representative lines published elsewhere in this issue reflect the tendency toward a continually increasing volume of traffic, apparently somewhat disturbed by the increased rates which went into effect September 1, but not sufficiently to overcome for long the effect of the normal upward trend. On the other hand the total production of passenger cars for domestic roads during the first ten months of 1920 was only 129 cars.

During the past year the demands for additions and betterments to all facilities were urgent. The railroad corporations, with limited cash and credit resources, have found it necessary to choose only the most urgently needed improvements for immediate prosecution. Roadway improvements, locomotive and freight cars have therefore been given attention practically to the exclusion of passenger equipment. The same conditions have applied also where improvements have been financed from the $300,000,000 loan fund created by the Transportation Act. At the present time a number of roads are considering the purchase of new passenger equipment, and assuming an early improvement in business activity, will place their orders during 1921.

It is unlikely, however, that the passenger car programs, though increasing from year to year, will effect a marked improvement in the service for several years to come.

Pullman Cars

Following the release from Railroad Administration control, the Pullman Company resumed the construction of sleeping cars, which had been discontinued during operation of the Pullman Car Lines by the Railroad Administration. From March 1, 1920, to the end of the year about 500 new sleepers have been built. Some of these have replaced retirements from the 7,622 cars reported by the Pullman Company for the fiscal year ending July 31, 1919, but they represent the beginning of a program that will gradually restore the facilities to pre-war standards.

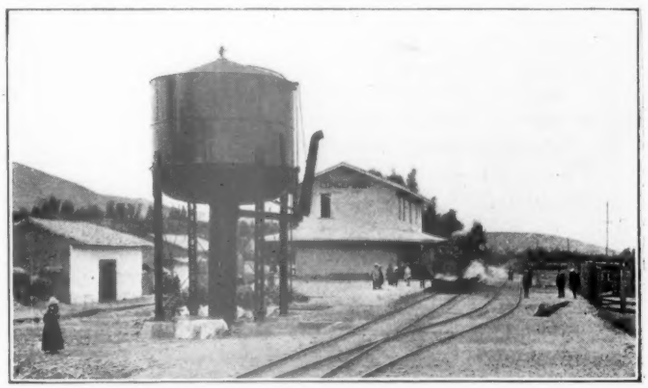


Photo from Keystone View Co., Inc., of N. Y.

At the Concepion Station of the Central of Peru

*See the *Railway Age* for January 2, 1920, page 37.

Repair Shop and Enginehouse Equipment Needs

Large Numbers of Unserviceable Locomotives and Cars Furnish a Strong Argument for Better Facilities

A MODERN STEAM LOCOMOTIVE intended for either heavy passenger or freight service is worth approximately $70,000 and with 63,580 serviceable *and unserviceable* locomotives on American railroads, the total capital represented amounts to several billions of dollars. In fact, it is stated to be 50 per cent of the value of all the machinery, implements and tools used in all other industries of the country. Even a larger amount of capital is invested in over two million cars and yet a considerable proportion of both motive power and rolling stock is held out of service and earns no revenue because of antiquated, inefficient repair shop and enginehouse equipment. A manufacturer watches his big investments in machinery most carefully, knows how much the machines are worth, how much they earn and keeps them in operation; otherwise he fails. The railroads should be equally considerate of overhead charges and make both cars and locomotives revenue earners as much of the time as possible by providing facilities for their prompt and thorough repair.

EVERYONE FAMILIAR with conditions admits the need for better machine tools and equipment for railroad shops and engine houses. Motive power and rolling stock will be in no condition to handle the increased traffic predicted for next Spring unless adequate arrangements are made for repair and maintenance.

A large proportion of the shop equipment needed should be bought now. Otherwise what may be gained by price reductions will be more than offset by losses due to delayed traffic.

Locomotives and Cars Out of Service

How long would a manufacturer do business if 25 per cent of his machinery was unserviceable? In 1918 and 1919, 20 per cent and 24.9 per cent, respectively, of the motive power of the country was held out of service awaiting repairs. Figures for the first ten months of 1920, compiled by the Car Service Division of the American Railway Association, show (Table I) that this proportion has been reduced to 23.3 per cent, of which 6.2 per cent of the locomotives are held for work requiring less than 24 hours and 17.1 per cent for work requiring more than 24 hours. No goal was set by the Association of Railway Executives for the reduction of locomotives held out of service, but it would be difficult to find justification for so large a proportion as 23.3 per cent. The railroads are now able to handle the business offered to them, but this business is far below normal. Now is the time to get motive power into good operating condition and reduce the locomotives out of service waiting repairs to the lowest possible number.

It is not maintained that the lack of shop machinery and equipment is solely responsible for the large proportion of motive power out of service. Limitation of output due to labor conditions, scarcity of trained foremen and inexperienced workmen are all factors to be considered. That there is a serious lack of modern machinery in many shops and roundhouses, however, is generally admitted and the longer its installation is delayed, the greater the loss to the railroads.

Records of the Interstate Commerce Commission show that in 1917, 1918, and 1919, 5.6, 5.7 and 7.1 per cent, respectively, of the freight cars in the country were in bad order. Based on the first ten months of 1920, the bad order cars have been reduced to 6.9 per cent, but even this figure is far from the 4 per cent goal set by the Association of Railway Executives. Due to present business conditions, it is true that the railroads are not faced with a car shortage, but even the pessimists do not believe that the business depression will last indefinitely and it would seem the part of common sense to get as many cars as pos-

sible repaired before the revival of business activity which is sure to come.

Strenuous efforts have been made in the past few months to reduce the number of bad order cars and one of the reasons it has been impossible to attain the goal of 4 per cent is the present lack of repair shop facilities. More shops should be erected and those already in existence should be better equipped. Particularly for steel car repair work, crane facilities are needed for handling cars and the more or less heavy material going into their construction. In addition to cranes, other machinery is needed for this work such as air compressors, air tools of all kinds, power punches and shears, presses, flanging machines and furnaces.

TABLE I—PROPORTION OF LOCOMOTIVES OUT OF SERVICE FOR REPAIRS

1920	Repairs requiring less than 24 hours	Repairs requiring more than 24 hours	Total
Week ending July 31	.....	15.4 per cent	.....
Two weeks ending September 1	.....	16.3 per cent	.....
Two weeks ending September 15	6 4 per cent	17.1 per cent	23.5 per cent
Two weeks ending November 1	6.5 per cent	16.2 per cent	22.7 per cent
Two weeks ending November 30	6.2 per cent	17.1 per cent	23.3 per cent

The slight reduction in bad order cars already obtained is largely due to the number of cars repaired by builders. During October, 1920, 3,920 cars were repaired by the 23 builders reporting to the Railway Car Manufacturers' Association, the total for the first ten months of the year being 25,180 cars. It is probable that an extensive car construction program will be outlined for the coming year and if so car builders will manifestly be unable to handle as much repair work as formerly. The importance of equipping railway shops to make quick, effective repairs to all kinds of freight and passenger cars can hardly be overestimated.

Facilities Needed for Modernizing

Of the 55,000 locomotives in service on American railroads, it is stated that only approximately 35,000 are equipped with superheaters, 43,000 with brick arches, 37,000 with automatic fire doors, 15,000 with power reverse gears, 2,000 with automatic driving box wedges, and 30 with feedwater heaters. In a paper read before the American Railway Association last June, George M. Basford said, that "by spending a few thousand dollars in modernizing, millions of dollars already invested in locomotives ten or more years old will earn greater dividends. These old engines stand as a big non-paying investment and a comparatively small amount spent for modern improvements will change them into a big paying investment."

Admitting the need of an intelligent and extensive modernization program, the question is, Are the railroads physically in a position to carry out this program? The answer must be, No.

"The difficulty in carrying forward an extensive reconstruction program," said C. B. Smith, mechanical engineer of the Boston & Maine before the American Society of Mechanical Engineers, "is in finding the shop facilities either on the railroad or among the locomotive builders in order to advance the work at a satisfactory rate of progress. On roads where the number of old locomotives which warrant rebuilding is sufficient to require a period of more than three years to complete the work, it would seem necessary to arrange for enlargement of shop facilities in order to hasten the reconstruction. If, however, adequate shop facilities are not forthcoming, the improvement program for locomotives must be confined chiefly to the application of superheaters and the substitution of piston for slide valves; together with the minor but relatively important betterments that may usually be applied at the shopping period. On some roads this work alone will require six years at the present rate."

The work of modernizing must go on and Mr. Smith's statement that some railroads are not equipped to apply modern improvements to locomotives in less than six years indicates a condition that is far too common on American railroads. Present operating expenses must be reduced to a minimum by the installation of efficient locomotive devices, and it has been demonstrated that this will be impossible without more and better shop facilities.

Roundhouse Equipment Needed

Another factor which needs attention is the proper equipment of terminals for handling locomotives promptly and economically. A locomotive is earning revenue usually only a few out of each 24 hours and the part of this time lost at terminals offers a fertile field for improvement. It is essential that inspection pits be provided, together with ample ash handling facilities and coaling stations, all on a direct line to the roundhouse. In addition, each roundhouse, especially if at some distance from the back shop, should have a fairly complete machine tool equipment. This will avoid the extra cost of shipping each locomotive part requiring a small machine operation to the back shop and holding up the locomotive while waiting for the part to be returned.

The old excuse is that railroads cannot afford to install machinery in roundhouses, especially the smaller ones. The truth of the matter is that they cannot afford not to. An investigation conducted five years ago showed that locomotives were in the hands of the mechanical department 58.5 per cent of the time and there is no evidence that conditions as a whole have improved greatly since that time. The interest at 6 per cent on $70,000, the price of a modern locomotive, is $4,200 a year and the delay of this locomotive at terminals due to inadequate, wornout equipment costs far more than it would to install required new machinery and tools.

Effect of High Labor Costs

During federal control working hours for railroad employees were reduced from nine hours in most cases to eight hours per day and the result of this decrease in hours made necessary an increase in the number of employees, variously estimated at about 190,000. The larger number of employees, together with the pay increase granted to all, makes the labor cost over one hundred per cent greater than it was even as late as 1917. Table II shows the rates of pay for certain employees in locomotive and car repair shops and roundhouses.

TABLE II—HOURLY WAGES OF RAILROAD REPAIR SHOP EMPLOYEES

	1917	1918	1919	January, 1920	July, 1920
Machinists	.462	.746	.747	.747	.857
Boiler makers	.462	.736	.767	.767	.897
Blacksmiths	.446	.744	.749	.749	.879
Carpenters	.322	.536	.633	.633	.763
Car repair men	.338	.574	.696	.696	.696
Helpers	.276	.467	.507	.507	.630
Unskilled help	.224	.361	.433	.433	.533

The increase up to January, 1920, is shown in the fourth column of the table and in July the Railroad Labor Board increased approximately all of these rates by thirteen cents an hour retroactive to May 1. As indicated, practically all of the rates have increased 100 per cent since 1917 and it is self-evident that if the cost of locomotive repairs is to be maintained at a reasonable point every possible labor saving machine and device must be installed.

It is not believed that every small shop in the country should be equipped with heavy, specialized machinery capable of large production. For example, in a certain shop, the method of machining the keyway in a new cross-head is to lay out the keyway, drill four 7/8 in. holes to remove most of the metal and chip and file out the balance. This is a difficult and tedious job requiring the effort of a mechanic at 85 cents an hour for several hours. At first thought, it would be supposed that such a shop could not

afford to be without a keyway milling machine which would perform the operation more accurately, in one-third the time, and at a much less labor cost. The element which must not be forgotten, however, is that such a specialized machine is usually high priced and must be kept busy a large proportion of the time in order to pay carrying charges and show a profit in operation. The problem in this case can be settled in but one way. All new crossheads for the system should be made at one central production shop where there will be enough work to pay for the installation of modern, specialized machines.

In the shop referred to, which is typical of many others, there is a little old radial drill which has certainly seen its best days and, in fact, is so old that no records can be found as to the date of its purchase. This machine is used to drill 2 9/16 in. holes, 4 in. deep, in forged wrought iron stock using a high speed drill; but it goes without saying that no production records are broken. The old drill press does not have the necessary power and the head wobbles so badly on the radial arm that it is difficult to understand how a hole can be drilled at all. What possible reasoning can justify wasting even a helper's time at 46 cents an hour and a high speed tool on such a machine!

It may be that the smaller shops cannot afford to install special machinery, but in any case they certainly cannot afford to maintain in service drills and machinery of the type indicated. The time involved in performing machine operations with this type of tool and the labor cost of operating obsolete machines by high priced mechanics are prohibitive. All parts possible must be made in central production shops where specialized, high production machinery can be installed. The saving in cost of parts so manufactured much more than offsets carrying charges on the investment and the cost of shipping the manufactured parts to outlying points.

Similar Problems in English Shops

That more or less similar conditions and problems confront English railway shop managers as do our own is evident from a paper presented before the Institution of Locomotive Engineers by Colonel H. E. O'Brien, deputy chief mechanical engineer of the Lancashire and Yorkshire, Horwich, England. Col. O'Brien states that "while patient attention to methods of manufacture on existing machines will result in increased output, the best results will not be obtained unless the most modern and most highly productive and specialized machinery is installed on a commercial basis. The introduction of high speed steel between 1903 and 1910 put many machines simultaneously on the scrap heap *or ought to.*" (The italics are ours).

Mr. O'Brien does not advocate the wholesale purchase of new and more powerful machines purely on an arbitrary basis. The decision to buy or not to buy must be based on a knowledge of the existing annual output of old machines and proposed new machines. "After all necessary allowances have been made," according to Mr. O'Brien, "it is hardly justifiable to purchase a new machine unless a return of approximately eight per cent on the capital expenditure is obtainable." Certainly no fault can be found with this line of reasoning and when shop foremen and executives clearly show their superiors by reliable figures that a certain machine will earn eight per cent on the investment, it will not be long before the necessary capital is forthcoming.

Capital Expenditures for Shop Equipment

It is impossible to ascertain exactly how much has been spent for new shop machinery and equipment in the past year, either to replace wornout machinery or for additions and betterments. The approximate amount is probably around $7,000,000, which is by no means adequate to cover the needs and only goes to show how large a field there is for the use of all kinds of machinery and equipment in railway shops and roundhouses. Reports from Chicago indicate that in that section approximately $1,400,000 worth of machine tools have been purchased during the year. There has been considerable activity in the southwestern district and in the east it is understood that a $2,000,000 project for increased shop and power house facilities is being considered.

Conclusions

In January, 1920, the *Railway Age* estimated that over one hundred and forty-six million dollars should be spent for improved shop machinery and equipment in the next three years. Of this amount 38 per cent or approximately fifty-four million dollars was considered necessary for the purchase of machine tools. As previously stated, figures are not available to show how large a proportion of this capital was so invested, but it is practically certain that less than one-third of the amount was forthcoming. The estimates stand the test of common sense, however, and nothing has developed in the past 12 months to show that they were extravagant. Certainly the importance of the question and the absolute dependence of industry upon adequately maintained motive power and rolling stock make evident the folly of limiting repair facilities.

The necessity and wisdom of *buying now* depend largely upon the need for a given product. If the lack of a $5,000 tool in a roundhouse is holding up $70,000 locomotives even a few minutes a day, it is obviously poor business management to delay buying the tool in the hope it may come down to $4,000 in price. There is a certain strength to the argument that permanent investments should not be made at present high rates of interest, but if everyone refused to buy, business would stop entirely and all would be losers. Business men as well as students of economics say that the present business depression will end in April or the early summer months when the railroads will again be required to move traffic exceeding their capacity. The shop and roundhouse equipment needed to keep cars and locomotives running at that time should be bought now. There can be no excuse for delay. What is lost in delays to traffic in May or June will far more than offset what is gained by possible reductions in the cost of machine tools and shop equipment.

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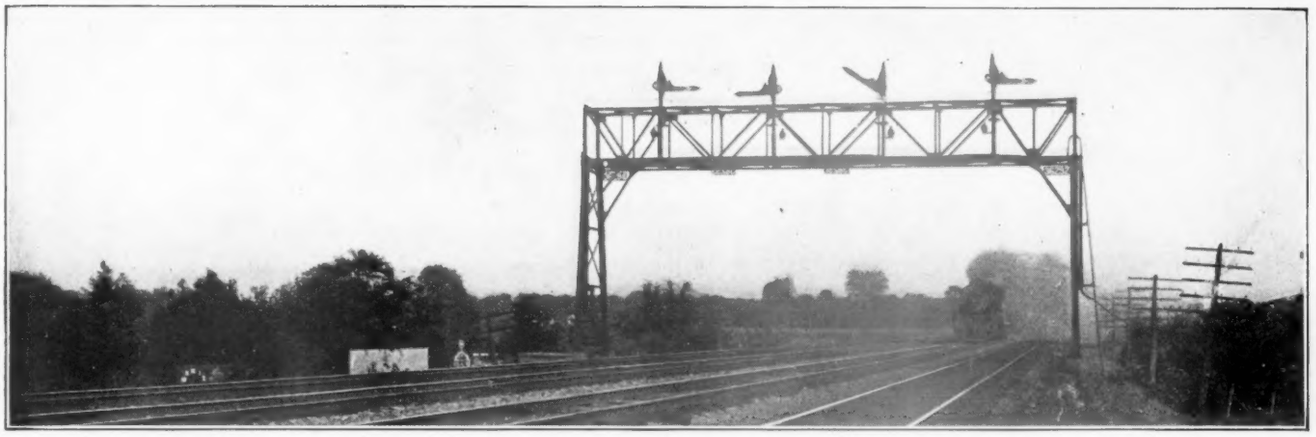
The Architecturally Beautiful Railway Station at Metz, Lorraine, France—Formerly Metz, Germany



On the New York Central. This road found a receptive market for a large bond issue in 1920

Attitude of Investors Toward Railroad Securities

New Speculative Interest in Stocks and Strong Confidence in Bonds Apparent in 1920

JOHN J. ESCH, chairman of the House of Representatives Committee on Interstate and Foreign Commerce, in an address at a dinner given recently in honor of S. Davies Warfield, president of the National Association of Owners of Railroad Securities, made the following statement relative to the rule of rate making provided by the Transportation Act:

"This provision is contained in Section 422 of the Transportation Act and was believed to be necessary to enable the roads to secure the money and the credit required to purchase additional equipment and betterments at lowest possible rates and take care of the present and immediately prospective wants of transportation. With the roads again under private operation and the guaranty of the standard return withdrawn, there must be proper encouragement given to the investing public if the carriers are to obtain the necessary funds to provide the additions, betterments and extensions required by an expanding commerce. The public cannot be compelled, but must be induced to invest. Stabilizing the credit of the carriers is a strong and necessary inducement. A public utility which has its income controlled through the regulation of its rates and its expenses, especially wages, also fixed by government authority, is entitled, upon moral if not legal grounds, to fair and just treatment."

The remarks of Chairman Esch are quoted here because they aptly point out the factors which influence the investing public and indicate the underlying question that must be answered in an article dealing with the Attitude of Investors Toward Railway Securities.

The question is—Has the investor been induced to put his money into railway securities as a result of the various developments that have taken place in 1920? The answer is that he has.

This answer is developed with due regard to the present state of the security market. It is evident, of course, that there has been but little market for securities of any kind during the past few months. Nevertheless, it does not require much investigation to determine that railway securities are regarded in a new light as a result of the treatment guaranteed the railways under the terms of the Transportation Act.

It is not desired here to discuss the conditions that have caused the present low level of stock and bond prices. It is desired to discuss the attitude of the investor rather than his ability to invest: the latter point is, however, discussed in the latter part of the article.

The attitude of the investor has two important aspects. One of these is contained in the confidence that has been inculcated through the passage of the Transportation Act. The other is the effect on the investor of the present trend of earnings and the probabilities as to these earnings in the near future. At this particular moment the latter factor is not favorable. It is compensated for, however, by a strong feeling of confidence in the railway situation. It is apparent on all sides that the public has caught the idea that the railways are to be given a square deal and that investments in railway securities will be reasonably safeguarded. There is in evidence, in fact, a certain feeling of popularity for railway securities at this particular time, encouraged to no small extent by a somewhat lessening confidence in industrial issues.

The favor that has been shown for railway securities has been especially evident in the interest in railway stocks. There is not as yet a market for new issues; reference is

THE BETTER TREATMENT guaranteed the railways by the terms of the Transportation Act has helped create a new feeling of confidence on the part of the buyer of securities.

Railway stocks and bonds are more popular than they were and equipment trust issues have been in special demand.

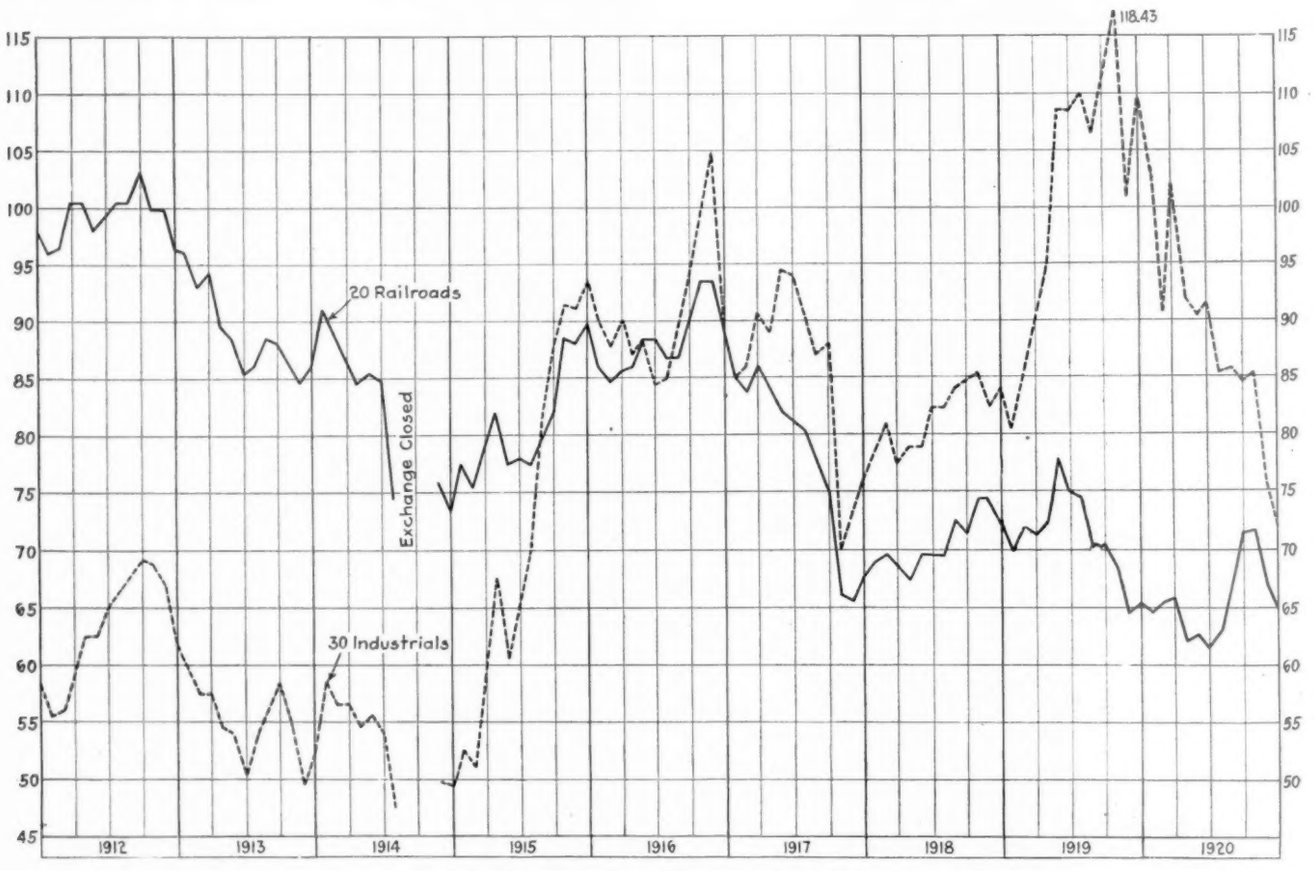
Prospects for 1921 are for declining interest rates. Hope is expressed for larger net income as coal and other railway material decline in price.

made to stock already outstanding. The trend of the prices of railway stocks during the year is shown in one of the curves on the chart. It is observed first that the average prices of the railway stocks chosen have been considerably below the average for industrials for some time. The railway stocks did not rise during 1919 as did the industrials so that the space between the lines showing the respective average prices of the 20 railroads and 30 industrials was much greater during the latter part of the year than during the early months. The railway stocks rose to an extent in sympathy with the general upward movement but in the early summer this sympathetic rise ceased. There was instead a decline of railway stocks going on contemporaneously with the rise in industrials.

In 1920 the relative relationship has been quite different. A decline in industrial stocks began in November, 1919, which has continued with various interruptions to the present time. One of these interruptions was in March and April. The railway issues continued their decline up to about February. The imminent passage of the Transportation Act then assisted a rise in the level of railway stock prices which, while it was not appreciable and was in part in sympathy with the rise in industrials, was nevertheless sufficient in volume to indicate a beginning of return of confidence in the railway situation.

The outlaw strikes, the decreased net earnings and the serious freight congestion followed, with the result that the major part of the small rise that had taken place was more than lost. When the Interstate Commerce Commission announced its favorable decision in the question of increased freight rates and passenger fares, confidence was again restored, so that in August, September and October there was another marked rise in railway stock prices. The falling off in business, the general liquidation of securities, etc., have since come into play so that railway stock prices at present are at a very low level.

Common Stocks	High 1916	Low Feb. 17, 1920, day before R.R. bill was reported	Low July 30, 1920, day before rate increase was announced	High 1920	Low 1920	Low Dec. 31
Atchison, Topeka & Santa Fe	108⅞	79	79	90⅜, Nov. 5	76, Feb. 11	82½
Atlantic Coast Line	126	88	85⅛	104¼, Oct. 5	82, Dec. 27	86
Baltimore & Ohio	88½	29⅛	31¾	49⅜, Oct. 15	27⅝, Feb. 13	35¾
Chesapeake & Ohio	71	49¾	51¼	70⅜, Nov. 5	47, Feb. 13	60
Chicago & North Western	134⅞	78½	68⅜	91½, March 10	60, Dec. 22	66½
Chicago, Milwaukee & St. Paul	102½	32	33⅜	44½, Nov. 5	21, Dec. 21	29¼
Chicago, Rock Island & Pacific	45¾	25¾	34¾	41, March 8	21½, Dec. 21	27
Illinois Central	109⅞	84	82½	97¼, Oct. 4	80⅞, Feb. 13	86⅛
Lehigh Valley	87⅛	41¼	42¾	56½, Nov. 3	39¾, May 24	54½
New York Central	114¼	67⅛	68	84¼, Nov. 5	64¼, Feb. 13	73¾
Norfolk & Western	147⅛	93	88⅛	105½, Nov. 26	84¼, June 16	99⅞
Northern Pacific	118⅞	71¾	71	95⅞, Nov. 5	66¾, June 12	84
Pennsylvania	60	40¾	39½	44, Oct. 7	37⅞, May 24	39¾
Southern Railway	36¾	20¼	27⅞	33¼, Oct. 5	18, Feb. 14	23⅛
Southern Pacific	104⅛	92⅛	91	118⅛, Nov. 4	88⅛, Feb. 13	99⅝
Union Pacific	129¾	114½	115	129½, Nov. 4	110, Feb. 13	119



The Trend of Stock Prices, 1912 to 1920

The fact that the railways with their increased rates have failed to secure the net railway operating income of 6 per cent in any of the four rate groups has not assisted by any means in recent months in inculcating confidence. It is the general consensus of opinion among observers who are real students of the problem, however, that this is but temporary. They express the opinion, to be sure, that it is not likely that net earnings will increase for several months. They have confidence for the future. They point to the fact that when business picks up gross earnings will, of course, increase while in the meantime the railways should be able to make important decreases in their operating expenses, with the result that when conditions are more normal the net earnings should be on a much improved basis. In this regard, particular attention is given to the decrease in coal prices. It is interesting to note that some of those who are selling securities express the hope that further increases in freight rates will not be necessary; they fear that such increases might have an unfavorable effect on confidence in the situation.

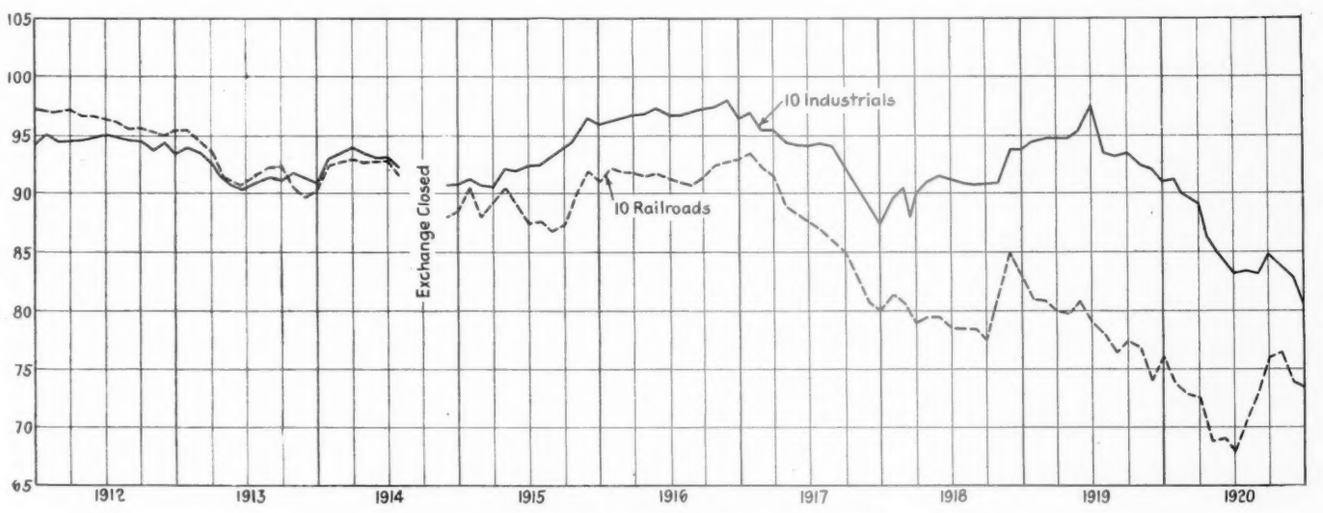
The foregoing is written with the thought in mind that the buyer of railroad securities, as a rule, regards railway stocks as speculative rather than investment securities. There are many railway stocks that rank as investments. These are pointed out in many cases as being priced on the stock exchange at present far below their real value. Those who deal in stocks have sufficient confidence in the railway situation to recommend such stocks highly. Another factor in connection with railway stocks has already been pointed out in the pages of the *Railway Age*. Reference is made to the live interest that has been shown in the stocks of companies that are spoken of as about to make segregations of their non-railway properties or as suggested for consolidation. The rumors that have been started and the activity in the stocks involved exemplify clearly the popularity of the railway shares from the speculative point of view.

Railway Bonds

The attitude of the buyer of railway securities towards bonds is shown in quite a different manner from that towards stocks. Bond issues appeal to the investor, whereas stocks, on the whole, have a greater appeal to the speculator. The bonds have stated earnings, the failure to pay which means receivership. The result is, of course, that the bond market is more in a state of equilibrium and the movement of bond prices reflects different factors from those indicated in the movement of stocks. In discussing the attitude of the buyer of securities towards railway bonds, a further distinction arises in that whereas there have been few new issues of stocks in an extended period of time, new issues of bonds have been made this year in large amounts.

Under present conditions the importance of the attitude of the investor in railway bonds is out of all proportion to that of the attitude of the purchaser of railway stocks. The purchasers of bonds include principally the large fiduciary institutions, such as the trust companies, the savings banks, insurance companies, etc. These institutions have something of a duty towards the public that is not necessarily expected of individual investors. As holders and guardians of the public's funds, they are properly expected to develop their investment policy, so that other things being equal, what they do is in the general public interest. Efficient transportation is one of the most important factors in the country's well-being and prosperity. Naturally, therefore, the investment of funds in railway bond issues is a matter of great

Bonds	Feb. 20, 1920. R.R. bill was reported Feb. 18	July 30, 1920, day before rate increase was announced	Low 1920	High 1920	Price Dec. 31
A. T. & S. F. Gen. 4's, 1995	78¼	74¼	69, May 21	82¾, Jan. 2	76½
A. C. L. 1st 4's, 1952	76	71⅝	69⅞, July 8	80, Jan. 5	76½
B. & O. 1st 4's, 1948	64	59	57½, May 20	74½, Oct. 8	68
C. & O. 1st Cons. 5's, 1939	90¼	88	84, April 26	95, Jan. 7	90
C. & N. W. Gen. 4's, 1987	77	72½	67, May 4	80, Jan. 3	76
C. M. & St. P. Gen. 4½'s, 1989	78	68½	67⅞, July 22	80, Oct. 18	75
C. R. I. & P. Ref. 4's, 1934	64½	65¾	60¼, Feb. 17	71, Oct. 2	67¾
I. C. 1st 4's, 1951	81	81½	79⅛, April 22	83⅛, April 16	83½
L. V. 1st 4½'s, 1940	86	78	77½, Dec. 20	87¼, March 16	80⅜
N. Y. C. Mort. 3½'s, 1997	66¼	64½	61¾, June 29	70⅛, Oct. 26	67½
N. & W. Cons. 4's, 1996	75½	74⅛	67¼, May 20	80, Jan. 2	77
N. P. Prior Lien 4's, 1997	75½	73½	69, May 20	80⅛, Jan. 3	76
P. R. R. Cons. 4's, 1943	81¼	79	81¼, April 7	83⅜, Jan. 16	81¾
S. P. Gold 4's, 1949	68¼	65⅛	61½, May 19	73, Jan. 10	70⅛
So. Ry. Con. 5's, 1994	82⅞	....	77, May 21	90, Oct. 21	85½
U. P. 1st 4's, 1947	82	80½	74⅛, May 21	85¼, Jan. 5	80¾



The Trend of Bond Prices, 1912 to 1920

importance and in no small measure a public duty. It is an encouraging thing, then, to find that the railway situation is regarded in such a light by these institutions that they have a most favorable attitude towards investments in railway bonds.

The New Outlook for Railroad Securities

The following statement by a vice-president of one of the important life insurance companies will indicate how that company regards the situation:

"The new year brings a more hopeful outlook for the return of railroad securities to that sound position which they should occupy in American business. This is true in spite of the present falling off in railroad traffic.

"While recent reports have not shown as large earnings in some instances as was hoped for, it is believed that a return to better conditions in the business world will bring these earnings more nearly in line. It is to be hoped that there will be an early decision by the United States Supreme Court settling the dispute over the power of the Interstate Commerce Commission with respect to the regulation of intrastate rates. The inability of the carriers in some of the states to bring their intrastate rates up to a level with the rates authorized by the Interstate Commerce Commission, has of course had a considerable influence on passenger earnings, as well as freight earnings.

"Naturally the securities of the stronger railroads have emerged ahead of the weaker lines and some of the railroad securities have been good investments even during the unsettled period due to the war.

"The insurance companies have for years realized the basic necessity for railroad securities being of the very highest order for the reason that the success of the railroads is to so great a degree the foundation for business success generally in this country. It is evident that the business world generally is now recognizing this fact and the recent action of the Interstate Commerce Commission shows that there is a more hopeful outlook from the standpoint of government regulation. We look for a much better market for railroad securities, a market which will be of interest not only to the general investor but to the insurance companies, savings banks and other organizations which occupy fiduciary relationship."

The statement made by this insurance officer is borne out by the observations and experience of the bond houses. They have found during this year an entirely new attitude as to railway bonds. There has been a decided change in the attitude of investors, which change was evidenced during the year, first following the passage of the Transportation Act and more emphatically after the increase in rates in August. One of the interesting features has been the change in the middle west where in some quarters for a period in recent years railway investments have not been as well regarded as they might have been. This has now been changed and a ready market has been found for such securities during 1920. It has also been found in the large financial centers that railway bonds are becoming more popular at the expense of industrial issues.

The feeling on the part of investors seems to be that the industrials have been through a boom period which is now over and which will not exist again in the same degree for many years, whereas the railways have just begun to come into their own. Much stress is placed on the protection given the investor by the Interstate Commerce Commission, not only through the rule of rate making provided by the Transportation Act but by the provisions relating to the issuance of new securities, those relating to loans from the revolving fund for maturities, etc.

In speaking of the large financial institutions sight must not be lost of the fact that many of these organizations are already large holders of railway bonds. These institutions through the National Association of Owners of Railway Securities, of which S. Davies Warfield is president, took a leading part in the working out of the Transportation Act. The fact that the law as finally passed has met with their approval is a matter of no small importance, for, of course, if the law had not supplied sufficient encouragement to investors the companies in question could hardly have felt justified in adding to their already large holdings.

The co-operation of the insurance companies is assured for the future through the new organization known as the National Railway Service Corporation organized by the National Association of Owners of Railway Securities. It is not necessary to enlarge upon the plan of financial assistance to the railways which the new company provides. It is sufficient to note here that its object is to assist in financing the purchase of cars and locomotives. The organization will supply through the investment institutions connected with it 60 per cent of the cost, while the remaining 40 per cent is to be supplied from the revolving fund administered by the Interstate Commerce Commission. Among the companies represented on the board of trustees are the New York Life Insurance Company, the Metropolitan Life Insurance Company, the Society for Savings of Cleveland, the Emigrant Industrial Savings Bank of New York, the Massachusetts Mutual Life Insurance Company, the Travelers Insurance Company, etc. The fact that companies of such standing as these stand ready to assist the railways financially should be clear enough indication of the new attitude of investors toward railway securities.

The trend of railway bond prices for the past two years has been generally downwards to about July of this year, when railway bond prices reached the lowest point which they had touched in many years. In August an upward movement began which ceased in October. Since that time, because of various market conditions, prices of bonds have again dropped so that now they are at a fairly low point, although not as low as earlier in the year.

During the year a number of large railroad bond issues were placed, at yields, on the whole, less than contemporaneous issues for strong leading industrials. About 80 per cent of the new issues were put on the market in April, May and June. The action of the Interstate Commerce Commission in discouraging borrowing at more than 7 per cent served as a retarding factor after that time and later it was not considered feasible to float loans because of the liquidation of business and the generally stagnant condition of the bond market. It is noteworthy that the equipment trust issues floated were especially popular and in great demand.

The Prospects for 1921

In looking ahead into 1921, the first thing that confronts the observer is the probable net earnings of the carriers for the coming months. It is likely that the net earnings for a few months in the immediate future will be somewhat disappointing. The recession in business will naturally have a drastic effect on gross earnings, which for a time will be clearly reflected in net railway operating income.

It seems to be the consensus of opinion that the present business depression will have worked itself out by about the latter part of spring or early summer. No one expects a boom to follow after that but observers do look for greater stability of business. They expect a cessation of the present rapidly declining prices and possibly a leveling up here and there of prices which may have fallen below the general level. Some do expect increasing prices at that time, but those who believe that there will be pronounced increases in the general level are in a small minority.

While business remains slack and gross earnings remain

(*Continued on page* 165)

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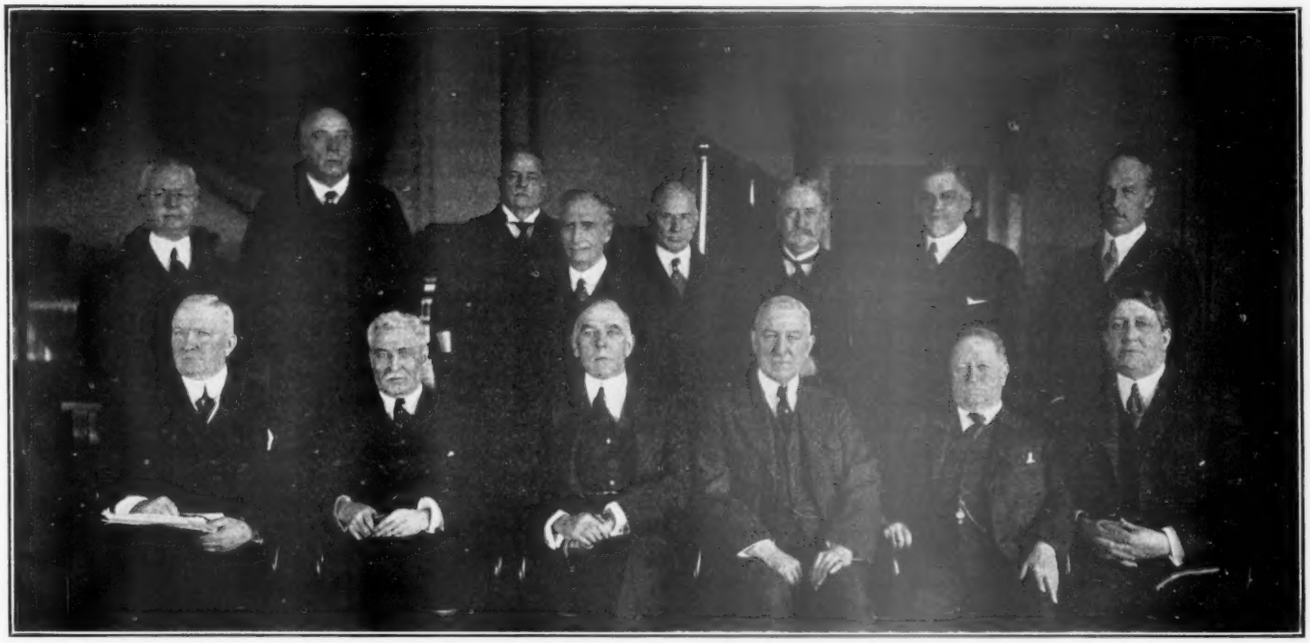
R. H. AISHTON
President of the American Railway Association



Railroad Executives at Washington for Conference with I. C. C. Standing left to right: Bird M. Robinson, F. D. Underwood, Julius Kruttschnitt, E. N. Brown, Daniel Willard, W. H. Finley, W. B. Storey, W. W. Atterbury. Seated—left to right: J. M. Herbert, Samuel Rea, A. H. Smith, T. De Witt Cuyler, Alfred P. Thom, E. E. Loomis.

General Railroad Developments During the Year

Period Since Return of Railroads to Private Management One of Transition and Readjustment

THE OUTSTANDING DEVELOPMENT affecting the railroads during the year was, of course, the return of the properties to corporate management on March 1. A review of the year's activities, therefore, consists largely of an account of the various measures that have been necessary to enable the roads to recover from the effects of the war and 26 months of "unified" operation by the government, and of the process of readjustment to the new conditions created by the Transportation Act.

When the year opened the return to private management had been definitely decided upon and the President had issued his formal proclamation relinquishing the roads as of midnight on February 29, but many of the conditions under which they were to be returned and the policy of regulation to be applied to them in the future were left in a state of great uncertainty until they were determined by the passage of the Transportation Act only a week before the date set for the relinquishment. In fact the conditions were so uncertain that the interests opposed to the relinquishment of federal control, including government ownership advocates in general and the labor leaders of the Plumb Plan League, kept up a bitter fight to the last minute for their retention by the government in spite of the proclamation which had been issued on December 24, and even tried to persuade the President to veto the bill after it had been passed.

PRIVATE management was restored on March 1, with the rate and wage questions still to be settled, with an impaired physical plant, and under a law providing new conditions of government regulation.

Seriously hampered by the outlaw strikes, the railroads recovered sufficiently to break all previous records for business handled.

While rates and wages have been advanced conditions have not yet become stabilized and the full effects of the new law have not yet been demonstrated.

The railroads were returned to their owners on March 1 under a new law which afforded much brighter prospects for the future than they had enjoyed for many years, but with an immediate outlook far from encouraging and with what the Interstate Commerce Commission has since described as "an impaired transportation machine." The railroad companies resumed the reins of management with very little cash on hand as working capital, under a scale of expenses which the rate structure could not hope to provide for until after a readjustment, and in debt to the government for most of the additions and betterments made during the period of federal control. They were faced, at a time of high interest rates, with a need for vast sums for further development to enable them to catch up with the industrial growth of the country during the war period, with their organizations more or less disrupted, and with the labor organizations bitterly hostile and demanding large increases in wages.

For about a month, with the encouragement afforded by the new law, a new spirit pervaded the railroad world and

the principal developments seemed to consist of the discontinuance of practices instituted by the government and those incident to a renewal of competition. Traffic soliciting offices were opened, advertising was resumed and occasional reports of an improvement in train service were made much of.

Switchmen's Strike

Then came the "outlaw" switchmen's strike, and by the middle of April transportation conditions were the worst ever known. Railroad officers who had in previous years spent a large part of their time in opposing the demands of organized labor for higher wages, began to express impatience at the delay of the Railroad Labor Board in passing upon the new demands. Shippers, who had rejoiced with the railroads at the termination of federal control, became critical again because the railroads could not handle their business, and the habitual critics of the railroads began to cry that private management had broken down. Private management had little to do with the wage problem, which, together with dissension in the ranks of unionism and the general spirit of unrest born of the war period, had brought on the strikes that tied up the railroad terminals, but private management had about the biggest job it had ever tackled in dealing with the physical aspect of the situation and in attempting to vindicate the claims that had been made for its superiority over the management that had been in charge for 26 months.

The railroad managers and the employees that remained loyal performed an almost superhuman task in keeping the railroads from a complete breakdown for a few weeks, and after the Railroad Labor Board had begun its hearings and most of the strikers had returned to work or had been replaced by new men, conditions began to improve. The cessation of work in most of the important terminals in the eastern part of the country had left such a congestion, however, and at a time when an enormous volume of traffic of all kinds awaited transportation, that a large number of railroad executives felt it necessary to call upon the Interstate Commerce Commission to exercise the emergency powers conferred upon it by the Transportation Act to assist them in dealing with the extraordinary conditions. The developments more particularly connected with transportation conditions and the combined efforts of the railroads, the commission and the shippers to restore order out of the chaos produced by the strike, are dealt with in another article in this issue.

Some Strange Contrasts

The railroad history of 1920 presents some strange contrasts. The railroads have handled a larger volume of traffic than in any previous year and their total earnings have consequently broken all records, but expenses have consumed a larger proportion than ever before and as a result the net operating income has been less than for any year in recent history. The year includes one month in which, on account of the switchmen's strikes, the railroads "ceased to function" to a far greater extent than during the period toward the end of 1917 when a similar statement was made of them as a reason for their taking over by the government, but it also includes several later months in which all previous records for the amount of traffic handled were broken.

The Labor Problem

It had been made clear some months before the railroads were returned that the Railroad Administration did not intend to readjust the rates in keeping with the increases in expenses that had occurred while it was in charge, and it was well recognized that one of the first problems to be solved in connection with the return of the roads was to readjust their rates to a basis that would be self-sustaining. Developments in January and February, however, resulted in the wage question also being postponed until after the return of the roads and in such a way that it became the immediately pressing problem.

After the President had issued his proclamation relinquishing the railroads the railroad labor organizations renewed their insistence on a settlement of their demands for increased wages which had been pending before the Railroad Administration Board of Wages and Working Conditions for several months. The subsequent developments are outlined in another article entitled "Labor Faces Economic Readjustments in 1921," published elsewhere in this issue.

The settlement of the wage question and the gradual return to something like normal conditions both on the railroads and in the country generally has led to a marked increase in the efficiency and loyalty of railroad labor, but the labor situation has by no means been entirely cleared up. The Plumb Plan League, claiming to represent the railroad employees but including as individual members only about 200,000 of them, has kept up a steady campaign of vilification of railroad managements, largely in connection with its unsuccessful efforts to defeat for re-election the members of Congress who voted for the bill under which the railroads were returned to private management.

A controversy between the labor organizations and the railroads has also arisen from the demand of the former for the establishment of national boards of labor adjustment. The Transportation Act provides for the creation of boards of adjustment by agreement between the companies and the employees, composed of an equal number of representatives of each side and the labor organizations have insisted on the formation of national boards such as those maintained by the Railroad Administration, while the railroads have insisted on local boards to settle local grievances at home and to enable each road to retain some control over matters of discipline.

Rates Advanced

One of the first questions to which the railroads turned their attention after the return of the roads was naturally an advance in rates to enable them to pay expenses and earn the return prescribed by the new law. Committees had been appointed by the Association of Railway Executives before the return of the roads to study the question of how an advance could best be made, whether in accordance with a plan worked out by the traffic department of the Railroad Administration during 1919 when it had given some consideration to a rate advance, for increasing revenues by raising the low spots in the rate structure, or by a uniform percentage. It was finally decided that the required amount of revenue could be raised in the short time available for the readjustment only by a uniform percentage advance in each territory. Whereas former general rate advance cases had been instituted by the filing of tariffs which were later suspended pending hearings and an investigation, the new law placed a responsibility for the adequacy of rates upon the Interstate Commerce Commission and also authorized the commission to initiate rates.

Informal conferences were held by the representatives of the railroads with the commissioners and in response to inquiries the commission said that it would be appropriate for the roads themselves to formulate specific requests for the establishment of rates which in their judgment would produce the income authorized by law. In the early part of May separate petitions were filed by the carriers in the eastern, southern and western territories seeking general increases in freight rates by percentages which they estimated, if applied to the traffic of the year ending October 31, 1919, would produce a net return of 6 per cent upon the property

investment, assuming that expenses continued at the unit figures prevailing during the first part of 1920.

Hearings were held by the commission extending over more than five weeks during which comparatively little opposition was manifested by the representatives of the shippers who appeared, except by those who were so situated that they would be placed at a comparative disadvantage by a percentage instead of a specific advance; on the other hand, large numbers of representative shippers strongly urged the advance and declared they were far more interested in doing something to enable the railroads to improve their service than in the amount of the freight rate. There was some objection to the use of the property investment accounts of the carriers as even a temporary basis of valuation for the purpose of calculating a fair return and the National Association of Railway and Utilities Commissioners, through its solicitor, urged the commission to take time to build up a figure for the temporary value by a detailed consideration of such information as was available for each road.

After the close of the hearings before the commission, the Railroad Labor Board issued its report awarding an increase in wages amounting to about $618,000,000 a year, which, it had been understood at the hearings, was to be added to the amount of the rate advance. The railroads filed supplemental proposals to provide for the additional amount by further advances in freight rates and also by advances in rates for passenger and other service not covered by the original applications.

On July 31, only 25 days after the close of the hearings, the commission announced its decision, dated July 29, allowing a 20 per cent increase in rates for passenger traffic and services accessory thereto, a surcharge of 50 per cent, to accrue to the railroads, upon the amount paid for Pullman accommodations, and increases in freight rates of 40 per cent in the eastern district, 35 per cent in the western district, 25 per cent in the Mountain-Pacific district, 25 per cent in the Southern district and 33⅓ per cent on interterritorial traffic.

These increases, the commission found, would be necessary under the conditions shown to exist, to meet the increased costs of labor and materials, and to produce as nearly as may be a net return of 6 per cent upon a valuation of $18,900,000,000. The carriers had used to represent a minimum figure for the value upon which to calculate the return, their cost of road and equipment, aggregating $20,040,572,611, plus a sum for working capital and materials and supplies, making a total of about $20,600,000,000. A 6 per cent return on this amount would have been $1,236,000,000 a year. Six per cent on the figure adopted by the commission is about $1,134,000,000 or about $100,000,000 more than the railroads had ever earned in a year and about $200,000,000 more than the standard return, based on the average for the three years ending June 30, 1917, which was the basis of their guaranty during the period of federal control.

It was roughly estimated that the percentages of increases authorized by the commission would result in an increase in revenues of about $1,500,000,000 a year if applied to both state and interstate traffic, allowing $600,000,000 for the new increase in wages and $900,000,000 to make up the deficiency in net operating income shown by the exhibits based on the constructive year ended October 31, 1919.

Attitude of State Commissions

At the request of the Interstate Commerce Commission, three representatives of the state railroad commissions took part in the proceedings in the rate case, concurred in the conclusions reached and issued a statement to the state commissions throughout the country to that effect; some of the state commissions, however, have failed to take action corresponding to that of the Interstate Commerce Commission, while in some states they were prevented from so doing by state laws. The railroads had filed applications with the various state commissions similar to those filed with the Interstate Commerce Commission and after its decision the states were asked to put into effect increases corresponding to those allowed upon interstate traffic, on the ground that anything less would prevent them, to that extent, from realizing the percentage of return contemplated by the law. Increases upon intrastate traffic were approved by the various state commissions as follows:

	Freight	Passenger
Increases approved in full	24	23
Increases approved with exceptions	17	7
No increase allowed because statutory provisions prevent action by state commissions	..	13
Smaller percentage increase approved	5	..
Increases denied	2	3
Increases denied in part	..	2
	48	48

In response to petitions filed by the railroads alleging discrimination against interstate commerce as a result of the action of the states that refused to allow the full increases, the Interstate Commerce Commission instituted a series of proceedings of investigation and in the New York, Illinois and Wisconsin passenger fare cases it has rendered decisions ordering the state rates to be increased by the amount of the interstate advances. The cases involving rates in other states are in various stages of progress, many of them having been submitted to the commission after final arguments.

These state rate cases have brought sharply to the front the conflict between state and federal regulation and the state commissioners, generally, through their association, regardless of whether they had themselves allowed the full advances, have organized to contest the power of the Interstate Commerce Commission to interfere with state rates. They have been represented at the various hearings by counsel and by a committee and have announced their intention of contesting the commission's interpretation of its powers under the new law through the courts. Meanwhile the rate situation in the various states continues to be complicated by the jurisdictional question, as in some cases the railroads have secured federal injunctions against the state authorities and in others the state authorities got an injunction first.

The advances in rates were generally accepted as being adequate on the whole, although for many individual roads and for certain groups of roads they are still inadequate and the New England roads have begun formal proceedings before the Interstate Commerce Commission to improve their condition by obtaining larger divisions of the through rates. The September and October earnings were not sufficient to provide the 6 per cent return contemplated by the law but the gross earnings showed a less percentage of increase than the advance in rates and it is apparent that the full effect cannot be ascertained until later returns become available, as the situation was complicated by the failure to receive the advances in many states and also by the amount of traffic still moving under the old rates.

Payment of Guaranty Delayed

Because during federal control the rates were not raised sufficiently to provide for the scale of expenditures and the deficits were met from the Treasury, Congress provided in the Transportation Act for a continuation for six months after the roads were returned of the guaranty which was provided while the roads were under federal control. That is, they were to receive one-half of the average income for the three-year period ended June 30, 1917. The six-months' period was decided upon on advice from the Interstate Commerce Commission that it would take about that long for the proceedings necessary for a general increase in rates. The

guaranty, however, was extended only to such carriers as filed an acceptance agreeing to pay over to the government any excess in railway operating income above the guaranteed amount, and as a safeguard against extravagant expenditures by the railroads, it was provided that for the purpose of computing the guaranty no more should be charged to expenses for maintenance than an amount to be determined by the commission based on the expenditures for the pre-war test period as equated for differences in the cost of labor, materials, etc.

Acceptances of the guaranty were filed by 666 carriers and 35 elected to take their own chances. These included the Southern, the St. Louis Southwestern and the Pere Marquette, but most of them were small roads which were so situated that they expected to earn more than they did before the war. The 35 roads earned about as much as their guaranty but the roads as a whole had a deficit for the six-months' guaranty period of over $200,000,000, which represents approximately the amount of the retroactive wage increase from May 1 to September 1.

The guaranty for the roads that accepted it was about $420,000,000 so the amount payable by the government to make good the guaranty is something over $600,000,000. Advances amounting to approximately $250,000,000 were paid on account of the guaranty as provided for by the law on applications filed by the roads up to September 1 on certificates by the Interstate Commerce Commission, but when the commission attempted to assist the roads by issuing certificates for additional partial payments on account of the guaranty the certificates were held up in the Treasury Department by a decision by the comptroller of the Treasury that partial payments were not authorized by the law and that payments after the close of the guaranty period could only be made on certificates by the commission for the full amount due to make good the guaranty as finally ascertained.

After several efforts by the commission and the railroads to obtain a reconsideration of this ruling an effort was made to test it in the courts by the filing of a petition by the Grand Trunk Western in the supreme court of the District of Columbia for a writ of mandamus requiring the Secretary of the Treasury to honor the commission's certificate. This delay in collecting the guaranty, the need for which was accentuated by the back wage payments made in July, August and September, has seriously affected the cash position of the railroads and made it necessary for some of them to borrow money from the banks to meet current expenses. The final settlement of the guaranty is likely to be protracted by the many complications entering into the adjustment of the maintenance accounts, and claims affecting the income for the guaranty period may be filed at any time within two years. The Interstate Commerce Commission in its annual report recommended that Congress amend the law to clearly provide for partial payments of the guaranty.

Loan Fund

The Transportation Act also provided a revolving fund of $300,000,000 to assist the carriers during the transition period immediately following the period of federal control by loans to meet maturing indebtedness or to acquire equipment or make other additions and betterments. The Interstate Commerce Commission immediately received applications for loans in such numbers and for such amounts that the fund would have been exhausted at once unless some definite plan of apportionment were adopted. The fund is to be loaned at 6 per cent, while the going rate for money has been considerably higher and most roads naturally attempted first to meet as much of their requirements as possible from the fund. The Senate had attempted to provide a larger fund, of $500,000,000, but because of the opposition of the House the amount had been reduced and it became necessary for the commission to give careful consideration to its apportionment, particularly as many of the roads most in need of the money were unable to furnish the security required by the law.

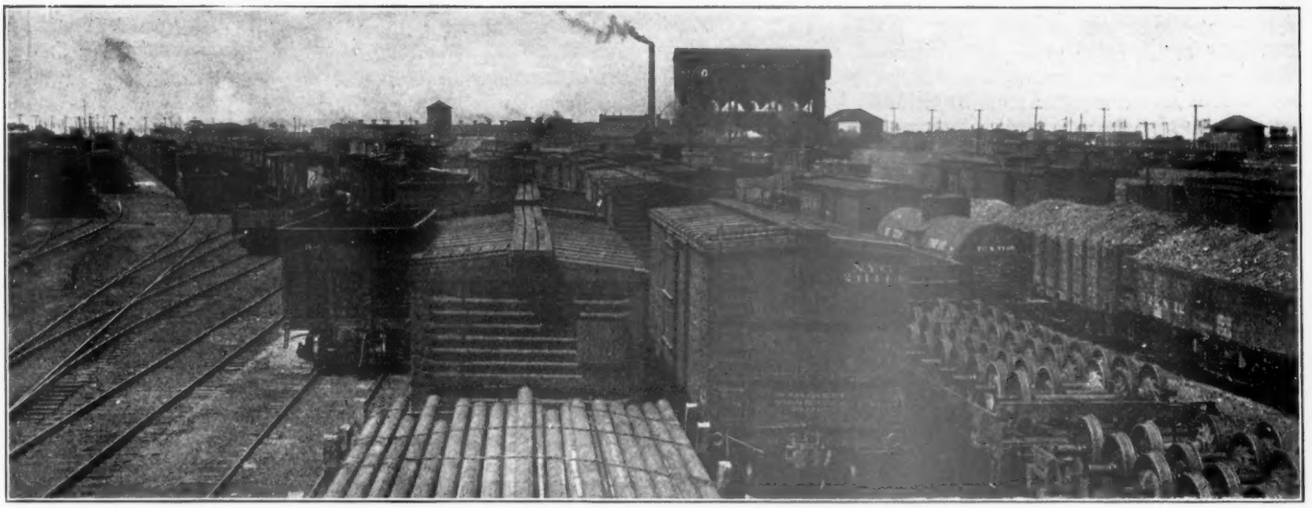
As the law was originally passed, the provisions for the loan fund were almost unworkable but an amendment was secured extending the maturity of the loans from 5 to 15 years and giving the Interstate Commerce Commission discretion as to the character of the security to be required. On May 29 the Interstate Commerce Commission held a hearing in respect of the general principles which should guide it in administering the fund and on June 7 it announced a tentative apportionment of the fund for various purposes but this still left open the question of the apportionment between various carriers. After some discussion and conferences the commission asked the Association of Railway Executives and the American Short Line Railroad Association to make recommendations on this point and the commission has been guided to a very considerable extent by their reports.

All of these preliminaries naturally tended to delay putting the fund at work and it was not until the latter part of the summer that any considerable part of the fund had been loaned. Another delay was caused by the position taken by the Treasury Department that it could not issue loans except upon an unqualified certificate from the commission that the railroad could not borrow money from other sources, whereas the commission had qualified several of its certificates with the words "except at excessive rates of interest." The commission finally got around this objection by deciding that the inability to borrow elsewhere referred to in the law meant a practical inability and that it could issue an unqualified certificate if it believed the interest rates that would have to be paid elsewhere to be excessive. The commission, however, adopted a policy of requiring carriers to borrow money for part of their needs from other sources as a condition of their receiving a loan from the revolving fund.

Loans have recently been certified by the commission as rapidly as the carriers have been able to make the necessary showing as to the facts which the commission is required to certify to the Treasury and as its organization has been able to pass upon the various details, but up to October 20 only about $56,000,000 had been actually loaned from the fund by the Treasury Department. By the first part of November the commission had certified loans amounting to $115,000,000 from the fund, of which approximately $81,000,000 had been actually loaned by the Treasury but additional certifications have since increased the total to some $150,000,000.

Photo from Keystone View Co.

Construction of the Tunnels Connecting Two Railway Stations in Brussels, Belgium



New York Central Yards, Toledo, Ohio. Photo by Ewing Galloway

Transportation Conditions During the Year 1920

Co-operation Between the Railroads, the Commission and the Shippers Overcomes Handicaps

THE RAILROADS during 1920 handled a greater volume of traffic and under probably greater difficulties and more handicaps than in any previous year in their history. They also during the latter half of the year establishd new records in some respects for the efficiency with which the traffic has been handled with the available facilities, although in the first part of the year, as the result of causes entirely outside of their control, they probably came nearer to a complete breakdown than ever before.

The railroads then organized to beat all previous records of either government or private operation and, with the co-operation of the Interstate Commerce Commission and the shipping public, were making remarkable progress in the accomplishment of the program they had set for themselves when the slump in traffic began. In spite of the business slump during the past two months, it is now clear that all records for freight handled by the railroads in a year have been broken. While the complete statistics will not be available for some time, the figures now at hand indicate practically as great a ton-mileage of freight in 11 months of this year as was handled in the entire 12 months of 1917 and but for the slump in November the 11 months' record might have exceeded that for any previous 12 months with the exception of the year 1918.

For the 10 months ending with October the number of ton-miles of revenue and non-revenue freight was 373,526,000,000, as compared with 328,792,000,000 in the corresponding period of 1919, and 365,855,000,000 in 1918. The ton-mile statistics for November and December are not yet available, but the number of cars of revenue freight loaded in those months was greater than in either 1919 or 1918. In November, 1919, the total ton-miles were 32,000,000,000 and in November, 1918, the total was 35,000,000,000, while in December in both years the total was 33,000,000,000.

From October 31 to December 25 the total car loading was 6,651,694 in 1920, as compared with 6,271,570 in 1919 and 6,281,389 in 1918. The weekly car loading has fallen off from 1,010,000 cars in the week of October 23 to 796,858 in the week of December 18. In the latter part of 1918 traffic also fell off sharply after the armistice and in the latter part of 1919 it was reduced considerably by the coal strike. The increase in November and December this year as compared with last year is more than accounted for by the increased coal loading this year, but it is rather difficult to say to what extent the reduction since October is more than seasonable because the traffic of the corresponding period of 1917, which was greater than that for 1918 or 1919, was probably abnormally high and the car loading figures for 1917 are not available for comparison with those of this year. For the week of December 18 this year the loading was less than for the corresponding week of 1919.

Statistics of freight car performance just compiled by the Bureau of Railway Economics for October show that the railroads in that month handled 42,562,685,000 ton-miles of freight, as compared with 40,166,000,000 in October, 1919. This represents, with one exception, the largest volume of freight ever handled by the railroads in a month. In August, in which month a large volume of freight was offered to the railroads to beat the new freight rates which went into

ALL RECORDS broken for volume of freight traffic moved, in spite of a shortage of equipment and other facilities and the set-back received from the switchmen's strike.

The railroads have also established new records for efficiency in car performance. Average miles per car per day increased from 22.3 in February to 28.5 in October. Average carload increased in the same period from 28.3 tons to 29.9 tons. New records set for net ton-miles per car day and tons per train.

effect on August 26, the ton-mileage was 42,656,000,000. For each of the months of July, August, September and October the ton-mileage has been over 40,000,000,000, a figure attained in only two months before—August, 1918 and October, 1919. In fact each of the four months broke the freight traffic record for the respective months and the four months have established a record that may not be equalled for some time to come.

The average mileage per freight car per day in October, 28.5 miles, not only established a new record for the year but was greater than has been recorded for any month since May, 1917, when the railroads had started their drive to increase the efficiency of freight car performance just after the United States entered the war. The average load per car, 29.9 tons, was slightly less than for September, when it was 30.1 tons. In average train loading, net ton-miles per car day and net ton-miles per mile of road per day the railroads have broken all previous records for any single month.

The record of ton-miles handled in each month of the year, with comparative figures for 1919, 1918 and 1917, is as follows:

NET TON-MILES REVENUE AND NON-REVENUE FREIGHT

	1920	1919	1918	1917
January	34,607,000,000	30,178,000,000	27,619,867,000	32,652,615,000
February	32,562,000,000	25,474,000,000	29,678,260,000	28,386,350,000
March	37,638,000,000	28,813,000,000	37,706,100,000	31,674,619,000
April	28,208,000,000	28,593,000,000	37,992,810,000	34,279,892,000
May	37,569,000,000	32,276,000,000	37,506,935,000	38,552,222,000
June	37,742,000,000	31,881,000,000	37,667,517,000	38,477,862,000
July	40,232,000,000	34,916,000,000	39,347,137,000	37,137,162,000
August	42,656,000,000	36,416,000,000	40,776,125,000	36,044,332,000
September ...	40,651,000,000	38,678,000,000	39,579,023,000	35,469,005,000
October	42,562,685,000	40,166,632,000	39,621,923,000	38,224,083,000
November		32,539,248,000	35,564,236,000	36,404,612,000
December		33,462,298,000	33,639,389,000	31,960,171,000

With the lessened demand for transportation service and with greater efficiency in freight car performance, transportation conditions have become decidedly easier during the past two months.

The car shortage, which on September 1 amounted to 147,000 cars, has given way to a large surplus of equipment. For the week ending December 23 the Car Service Division of the American Railway Association reported a surplus of 127,723 cars, largely box cars, while there were still shortages amounting to 9,056, representing largely a demand for coal cars in the eastern districts.

The Interstate Commerce Commission has cancelled all of its priority orders, giving preference in car supply to coal shipments, and the programs for the shipment of coal to New England and to the Northwest via the lakes have been fulfilled. Up to December 25, 1920, the Geological Survey reports a total production of bituminous coal amounting to 547,264,000 net tons, which exceeds that for the corresponding period of 1917—546,025,000—when there was a heavy demand for coal and the production about equalled the demand. In 1918, in the corresponding period the production was 572,692,000 tons but this represented an excess which resulted in a much smaller output in 1919.

For the year 1920, the Geological Survey estimates a probable production of 555,000,000 tons.

Transportation conditions throughout the year have been dominated by two important factors, aside from the general effects of the war and those resulting from the fact that for 26 months the railroad properties had been out of the control of their own organizations and had been operated by a government organization.

These factors were the coal miners' strike which began in November, 1919, and the outlaw switchmen's strike which began in April. The coal strike caused such a depletion of coal stocks as to create an enormous transportation problem in relieving the shortage and building up new reserves and the switchmen's strike for several weeks caused a paralysis of the efforts to cope with the problem and to handle the enormous volume of general freight demanding transportation. As a result, a situation was created which affected the entire industrial activity of the country. On the other hand the condition caused by the two strikes was so serious and demanded such a degree of forbearance and co-operation on the part of all concerned to deal with it at all, that without doubt, it may be said that the strikes were largely responsible for the great degree of success that was later attained.

Railroads Returned in Impaired Condition

The condition in which the railroads were returned by the government on February 29 is now fairly well understood by all who are at all conversant with transportation conditions, although at the time a great many people who had become dissatisfied with the results of government operation and conditions resulting from the war seemed to have a confident belief that all that was necessary was for the government to let go and for the former corporate managements to resume control to restore pre-war conditions. It is now well recognized that the roads were returned in an impaired physical condition, particularly as to equipment, as the result of the intensive use to which it had been subjected for three years, that the railroad facilities had not been expanded while the industrial capacity of the country had been enormously developed, that most companies were without working capital, their organizations had been considerably disrupted, and the morale of their employees was at a low ebb, while business was expecting more of the railroads than ever before.

The country had embarked upon a program of reconstruction and production in an effort to replace the shortage and waste of war times and to bring about a condition of prosperity following the period of uncertainty and depression which succeeded the armistice and the railroads were faced with an enormous demand for transportation. In fact they had already in January and February, the last two months under federal control, carried a larger volume of freight than ever before in those months.

The private managements on March 1 inherited a considerable amount of accumulated dissatisfaction among their employees as the result of the unsettled state of their negotiations with the Railroad Administration over matters of wages and working conditions. There was also undoubtedly a feeling of discontent among the men because of the adverse decision of Congress with regard to their proposals for a radical reorganization of the railway industry along the lines of the Plumb plan and because the demands of their leaders that the return of the railroads be postponed had been disregarded.

The Switchmen's Strike

Private operation had hardly got under way during March when the dissatisfaction among the classes of railroad employees which had received somewhat less consideration than others during the war period made itself manifest in a series of strikes of yardmen and switchmen, which began about the first of April and served seriously to retard railway operations not only during April but during two or three succeeding months. Although unauthorized by the recognized union leaders and branded as "outlaw" movements, the strikes could hardly have been organized in a way to have affected transportation more seriously. Many of the unorganized strikes occurred without warning, in many instances the men went on so-called "vacations" without presenting any demands and many men simply quit their employment to take more remunerative jobs elsewhere. The strikes were most complete in the great eastern cities which

are railroad terminals and gateways and also the centers for great industrial activity, and the effect of the withdrawal of labor from railroad service was wholly disproportionate to the number of men that left the service.

The congestion which had existed at important gateways and terminals was enormously magnified and necessitated the placement and maintenance of numerous embargoes. Hundreds of thousands of cars were left standing in terminals for days and weeks because of the shortage of switching forces, and not only was the ability of the railroads to accept new freight enormously reduced but the congestion backed up and the movement of such freight as was handled was slowed up. In some cases men who left the railroad service to take higher paid jobs with industries that were bidding for labor with which to produce goods that could be sold for almost any prices asked, soon found themselves out of jobs again because the railroads could not supply the industries with cars.

"In effect, it was as if about 750,000 cars for the time being had ceased to exist as facilities of commerce," said the Interstate Commerce commission in its annual report. "The April congestion caused by the strikes had the effect of reducing by fully one-third the equipment available as compared with that available on the resumption of private control."

"The general public will never know how close the rail and water transportation systems of the United States came to a complete cessation of functioning in the industrial heart of the country as the result of strikes beginning in April and which continued in diminishing force until midsummer," said Commissioner Aitchison in a recent address. "Indeed, because the stimulus of war was absent, the condition in the spring of 1920 was more menacing to the domestic welfare of the country than it was in the early winter of 1917 when federal control was assumed."

How the strike affected the volume of traffic handled may be observed in the table showing the ton-mileage month by month. Whereas in March the ton-miles aggregated over 37,000,000,000, in April they were reduced to 28,000,000,000.

Freight Car Accumulations

The only statistical measure of the congestion produced by the strike is the weekly report compiled by the Car Service Division of the American Railway Association showing the principal accumulations of loaded cars in excess of current movement. There had been congestion during the winter months and the accumulations had ranged from 74,000 in the week ending January 2 to 122,000 in the week ending February 20. On April 2 this had been reduced to 93,000, but on April 16 after two weeks of the strikes, accentuated by bad weather in some parts of the country, the total accumulations amounted to the unprecedented total of 288,000 cars. It was not until the middle of July that the accumulations were again reduced to below 100,000 cars and not until October 8 that the number was brought as low as 41,000, which is about normal for a year of heavy traffic. For the week of December 17 the accumulations were only 28,830 cars. During April the average daily accumulations were 208,698, of which 25,692 cars were held on account of embargoes. By the latter part of October the average had been reduced to 39,807, of which only 1,071 were held on account of embargoes and over half were held awaiting export or coastwise movement.

The worst period of the strikes lasted only about two weeks, during which time the railroads at many points were largely dependent upon office men, officials, inexperienced laborers and even college student strike-breakers for such switching service as was performed. After a week or so the newspapers practically ignored the strike, although to those particularly interested it was apparent that it was the dominating feature of the situation for the next 10 weeks or more.

Almost every important rail gateway and junction point from Kansas City and St. Louis east to Philadelphia and New York was affected, and even after the railroads had regained something like a normal switching force in point of numbers a large proportion of the men were inexperienced; they had chaotic conditions to deal with and the accumulations of delayed loads were so great that all movement was slowed up for several weeks. The car shortage, which had prevailed since August 1, 1919, was magnified by the slow movement. Shippers could not get their products handled and receipts of raw material were slow and irregular. Goods were in transit much longer than usual, which placed a strain on credit facilities and many plants had to shut down temporarily.

The result was an enormous flood of protests to Washington, to the railroads and to state and even municipal authorities. Shippers and even some railroad men who had previously complained of the wage increases made by the Railroad Administration began to criticise the Railroad Labor Board for inaction. Particularly vociferous were the complaints of the coal operators and the large consumers of coal, who had been striving to overcome the shortage resulting from the miners' strike, and whose demands for cars had greatly exceeded the supply even before the switchmen's strike. The general congestion caused delays in the placing of empty cars at the mines and coal already in cars was delayed in reaching the consumers. In March the Car Service Commission had inaugurated a campaign to furnish cars enough for a weekly production of 11,000,000 tons of bituminous coal and this was attained during the last week of March, but in April production fell to 8 or 9 million tons a week. For several weeks during the latter part of the year production has exceeded 12,000,000 tons a week.

Unscrambling the Freight Cars

The railroads on March 1 had taken over the Car Service Section of the Railroad Administration, which the latter had taken over from the American Railway Association at the beginning of federal control. It was reorganized as the Commission on Car Service of the American Railway Association, but with a considerably reduced force and very uncertain powers. One of its first tasks was to try to bring about a relocation of the freight cars which had been pooled by the Railroad Administration and which, by reason of the transportation conditions of the latter part of 1919, had become badly scattered from the standpoint both of the needs of traffic and of ownership.

When the railroads were taken over on January 1, 1918, 44 per cent of the cars were on their home lines. When they were returned on March 1 only 21.9 per cent of the cars were at home. Too many coal cars were in the west, where they had been sent at the time of the coal strike and where they had been retained by the increasing demands for local traffic. Too many of the box cars that had moved eastward with grain in the fall of 1919 had similarly been held in the east, although a large part of the grain was still to be moved and the western district was clamoring for cars with which to get rid of the accumulation. Relocation orders were issued by the Commission on Car Service for the movement of large numbers of cars but observance of the orders was slow and on some roads they were honored only if it was entirely convenient to do so.

Interstate Commerce Commission Asked to Use Emergency Powers

After a few weeks of the uphill struggle, a large number of railroad executives decided that the odds against them were too great and called upon the Interstate Commerce

Commission to exercise its emergency powers. The railroad men were not unanimous in this decision. Some felt that they were making progress and that to ask for help would be a confession of weakness and might lead to the exercise of a greater control over them than they desired. Some felt that the railroads should be able to organize themselves in such a way as to render it unnecessary to ask the Interstate Commerce Commission for assistance. The opinion which prevailed, however, was that while progress was being made the set-back they had received was so great that valuable time would be lost if they failed to take advantage of any possible assistance. The Interstate Commerce Commission possessed powers which the railroads themselves could not exercise; they were restricted by laws against discrimination, and many of them felt that while they were willing to set aside selfish interests in order to co-operate for the common good and the public interest, the extent to which they should do so should be determined by some outside authority and not be dependent upon varying degrees of willingness to sacrifice the interest of a single road to the interest of the entire situation.

On May 15 the executives filed with the Interstate Commerce Commission an informal petition in which they stated their urgent need for additional freight cars and locomotives which there was no immediate opportunity to procure, and that relief in the movement of the commodities most essential at that time—foodstuffs, perishables, livestock, coal and newsprint paper—could only be afforded by the use and movement of the existing equipment in the most effective manner. In the public interest the roads called upon the commission to exercise the emergency powers granted it by the Transportation Act, with respect to the giving of priority and preference in the movement of necessary food, fuel and other vital commodities; the relocation of empty equipment; the necessary postponement or delay of loading or movement of other less important commodities; and the reduction of passenger service as far as might be necessary in order that to the extent necessary the carriers might be relieved from the operation of federal and state laws and orders recognized under ordinary transportation conditions.

The commission had already formed a Bureau of Service to assist it in carrying out its functions with respect to car service, with F. S. Robbins as director and with a small organization. Acting upon the carriers' petition and upon information already in its possession, the commission determined that an emergency existed of so exigent a nature that its powers ought to be exercised immediately and without the holding of any hearing at the time.

I. C. C. Service Orders

The railroads' petition had suggested the setting up of a list of essential commodities entitled to priority in transportation and requests for priority ts to nearly every important commodity were received by the commission, but the commission was not impressed with the need for or desirability of a general priority plan. Later it was impressed with the necessity of special consideration for the movement of coal but its first service orders issued on May 20 were directed toward relieving the congestion and bringing about the relocation of cars. Service Order No. 1 required and authorized the railroads to forward traffic by the routes most available to expedite its movement and relieve congestion, without regard to the routing by shippers or other carriers or to the ownership of cars. The second order required various western carriers to deliver, within a period of 20 days, about 30,000 open-top cars to their eastern connections and the third order required eastern carriers to deliver about 20,000 serviceable box cars, preferably cars owned by western carriers, to their western connections within a period of 30 days.

Car Relocation

After the expiration of the orders they were continued with some modifications by the Car Service Division until approximately 130,000 box cars had been sent westward and an approximately equal number of coal cars had been returned to eastern roads. The Car Service Division also issued many orders for smaller movements of cars from road to road or from district to district, in accordance with the needs of traffic, and compliance with the directions of the Car Service Division has been so general that it was not necessary for the commission to issue formal orders of this character.

The plan adopted has sometimes been referred to as "pooling," but while the demands of traffic were considered paramount to the ownership of the cars most of the orders issued had the effect of returning cars at least in the direction of the home roads and the percentage of home cars on home lines has steadily increased throughout the year.

Terminal Committees

In addition to issuing the orders, the commission cooperated with the railroads in many other ways. It appointed terminal committees at 30 railroad and traffic centers, assigning to each a representative, usually a safety inspector, who acted as chairman and made reports to the commission. The other members of the typical terminal committee included a representative designated by the railroads; a shipper, preferably one who had served as a member of a somewhat similar committee during federal control; and a representative of the state railroad or public service commission. The railroad representative was usually the chairman of a local car service committee appointed by the Commission on Car Service following the practice adopted in 1917 but abolished after March 1.

Each of the committees was expected to do what could be done informally, by conference, advice and negotiation, to keep its gateway open and to advise the commission as to needs. The commission committees acted in close contact with the committees of railroad operating officers organized by the Car Service Commission, and both played an important part in relieving the unprecedented congestion. One of the principal methods used at first was to take advantage of the rerouting privileges under Service Order No. 1. The use of the embargo was also considerably developed and action was taken in various directions calculated to meet local conditions.

The commission issued its first priority order on June 19, the effect of which was to require coal-loading carriers to use coal cars primarily for the transportation of that commodity and to require roads not loading coal to deliver such cars to their coal-loading connections, to the extent of the ability of such connecting lines to receive and absorb that class of equipment. The railroads were also required to place an embargo upon consignees who detained coal cars unreasonably. This order was followed from time to time by others, designed to promote the movement of an adequate supply of coal to New England via tidewater and to the Northwest via the lakes as early in the season as possible so that it would not have to move later through unusual rail routes with loss of efficiency of equipment and further congestion of gateways. Various other orders were issued, representing modification of earlier orders, curtailing the supply of cars to wagon mines and giving preference to public utilities and public institutions.

The coal transportation situation was greatly complicated, not only by the real shortage of coal following the strike of last year, but by the price situation which resulted from the unusual scramble for this basic commodity. Many large consumers who had made the usual form of contracts for coal early in the year failed to receive their supplies because of

the greater attraction of the "spot" market on which the demands were concentrated. Many others had failed to make contracts because of a hope that prices would go down. The result was that even after coal production had been greatly stimulated the coal was being unevenly distributed and the railroads and the commission were criticized for many situations resulting from the competition among coal operators and sellers for the cars and among consumers for the coal. The coal industry is largely over-developed and even when the railroads are able to furnish enough cars to supply all the coal needs of the country they are not able to supply all the mines with cars enough to handle their full output.

This year the coal demands were met only at the expense of shippers and consumers of other commodities that require open-top cars, such as construction and road-building materials. Loud protests were made by these shippers, both at hearings and in other ways, against the preference accorded the coal traffic, but while every effort was made by the commission to mitigate the inevitable hardship, and from time to time, by amendments to the definition of coal cars in its orders, cars were released for other traffic, and permits were issued authorizing the use of specified numbers of cars for commodities other than coal when the public interest seemed to require such action, the commission took the position that fuel was a first essential. The commission's orders were usually issued after conferences with and recommendations from the railroads, the coal operators and the other interests most concerned.

The first priority orders issued by the Interstate Commence Commission stated that an emergency existed requiring immediate action "because of a shortage of equipment and a congestion of traffic, aggravated by unfavorable labor conditions." Later, after a large proportion of the switchmen had returned to work and the dissatisfaction among the employees had been largely dispelled by the award of the Railroad Labor Board, the commission left out the reference to labor conditions in its orders, and in its latest orders "congestion of traffic" was omitted as a reason.

Campaign for Increased Efficiency

It had early become apparent that the railroads were not going to be able to add materially during the year to their supply of equipment or of other facilities. Their properties had been returned on rather short notice, interest rates were high, their credit had been improved somewhat by the passage of the Transportation Act but bankers and investors were waiting to observe its actual effect as indicated in the commission's decision as to increased rates, and the revolving fund of $300,000,000 provided to assist the carriers in financing new equipment and improvements required many preliminaries before it was actually put at work, while payment of a large part of the six-months' guaranty was also delayed.

It therefore became necessary to minimize the effects of a shortage of equipment by increasing transportation efficiency and by car conservation. Whereas railroad men had been inclined to place a large part of the responsibility for the unsatisfactory conditions upon the shortage of cars and other facilities, the effects of the switchmen's strike were so serious as to make it necessary to concentrate on efforts to bring about an improvement in operating efficiency by increasing the average car load and increasing the average daily mileage of each car. In this respect there has been close co-operation between the Bureau of Car Service of the Interstate Commerce Commission and the Car Service Division of the American Railway Association, the individual carriers and numerous organizations of shippers.

The terminal committees did an important work in urging upon shippers and consignees the necessity for loading and unloading cars promptly and for loading cars as nearly to capacity as possible and the commission in numerous public statements also called attention to the need for reviving some of the methods of patriotic co-operation practiced during the war. Statistics bearing on efficiency of operation have been analyzed day by day and the attention of the operating executives was called with good results to many situations warranting attention.

The Railroads' Advisory Committee

Shortly after the commission had been asked to exercise its emergency powers the railroads, through the Association of Railway Executives, appointed an Advisory Committee of nine railway executives, representing the various sections of the country, to direct the co-operative efforts of the railroads in a drive for "more transportation" and to serve as a point of contact with the Interstate Commerce Commission. The committee itself did not attempt to become as active as the Railroads' War Board, which was located in Washington during 1917. It worked largely through the Commission on Car Service, which was reorganized on July 1 as the Car Service Division of the American Railway Association, but Daniel Willard, chairman of the committee, was exceedingly active in an informal way, representing the railroads in conferences with the Interstate Commerce Commission and shippers' association and in making public addresses, and generally directing the campaign.

At a meeting of the Association of Railway Executives in New York on July 16 the campaign was given a definite aim by the adoption of resolutions under which all members of the association and other carriers were urged to devote their utmost energies to the more intensive use of existing equipment and the railways undertook, with the co-operation of the public, to attain the following definite objects:

(1) An average daily minimum movement of freight cars of not less than 30 miles per day;

(2) An average loading of 30 tons per car;

(3) Reduction of bad order cars to a maximum of 4 per cent of total owned;

(4) An early and substantial reduction in the number of locomotives now unfit for service; and

(5) More effective efforts to bring about the return of cars to the owner roads.

Average Car Mileage

The average of 30 miles per car per day, for all roads, had never been attained, so far as available records show. The annual average attained in 1917, under the direction of the Railroads' War Board, was 26.1 miles per car per day. In 1918 the Railroad Administration averaged 24.9 miles, in 1919, 23.1 miles, and in January and February, 1920, 22.8 and 22.3 miles, respectively. The average for March was slightly better, 23.8 miles, but in April, as the result of the strike, it fell to 19.4. Since then there has been an increase in each successive month, until in October an average of 28.5 miles was attained. The average for the seven months, March to September, was equal to that made by the Railroad Administration in the year 1918, while the average for October was higher than was ever attained by the Railroad Administration and was the best ever recorded except in May, 1917, when an average of 29 miles was attained.

Car Loading

The average car load set by the railway executives as their goal, 30 tons, had been surpassed only in August and September, 1918, when the Railroad Administration had the power to force heavy loading as a part of the war program. In those months an average load per car of 30.4 and 30.2 tons had been attained. The annual average attained by the railroads in 1917 was 27 tons, in 1918 the Railroad Administration had an average of 29.1 tons, which was reduced in 1919 to 27.8, and in January and February, 1920,

the average was 28.3. In March the average was the same as for the preceding two months, in April it was increased to 28.6, in May it fell to 28.3, but from that time on it steadily increased to 30.1 in August and September. In October the average fell again to 29.9.

The combined effect of heavier loading and more rapid movement of cars is reflected in the statistics of net ton-miles per car day. The average for 1917 was 495, for 1918, 491, and for 1919, 441. In March of this year the average was 495, in April it fell to 379, but since then it has shown an increase in each month: June, 505; July, 526; August, 561, and September, 568. The best performance during the war was 542 miles per car per day in June, 1917, while the best performance of the Railroad Administration was 535 in August, 1918. The averages for August and September this year are the highest ever recorded.

The heavier car loading was also reflected in the average trainload, which was increased from 725 tons in March to 788 tons in August. This was a new record, but the average in September fell to 767. The best previous record was 778 tons in September, 1919.

In the return of cars to their home roads substantial progress has been made in spite of the heavy demand for cars throughout most of the year. The percentage of home cars on home lines had been increased from 21.9 on March 1 to 38.7 on December 15 and by that time all orders for the relocation of cars had been fulfilled or withdrawn. With the lessened demand for equipment it was believed that the cars would find their way home under the general application of car service rules and an equalization plan put into effect on October 1.

Very little progress has been made in reducing the number of bad order cars and locomotives. Under the intensive use to which they have been subjected for the past four years it was difficult enough to keep the percentages of unserviceable cars and engines from going higher. The percentage of bad order cars has been less than in 1919, but it increased from 7 in March to 7.3 in October. The statistics of unserviceable locomotives have not been kept continuously on a comparable basis. On December 1, 17.2 per cent were held out of service for repairs requiring over 24 hours and 6.2 per cent for repairs requiring less than 24 hours. On June 12, 26.9 per cent of the locomotives were unserviceable.

Car Shortage

During January and February there was a shortage of freight cars ranging from 70,000 to 80,000. For the week ending March 31 the average daily shortage was 87,600. By June 1 this had been increased to 105,000, by July 1 it was 123,000, by August 1, 125,000, and by September 1, 147,000. This large shortage during the summer months led to many fears that it would be greatly increased by fall when the height of the crop moving season was reached, and much attention was paid to building up the car supply of the western roads, but the increase in the efficiency of car movement actually brought about a decrease in the shortage during September and October, while the number of cars loaded continued to increase.

By October 1 the shortage had been reduced to 80,000, and there has been a steady reduction since until during the week ending November 22 the shortage of 30,724 was exceeded by surpluses amounting to 32,368. The railroads were materially assisted in the handling of the grain crops by the fact that so many of the farmers refused to ship their grain to market because of the fall in prices, which will spread the movement over a longer period, and as a result most of the complaints which were made regarding car shortage in the west were those which were made early in the season and those made in anticipation. Surpluses of cars began to be reported from the Southwest by the first part of November.

The heaviest traffic month this year was August. Conditions had been rapidly improving for two or three months and a considerable volume of freight was offered to the railroads just before August 26 for the purpose of getting it into the hands of the railroads before the new increased freight rates went into effect. During the first part of September there was a slight falling off, which was soon recovered, and the car loading increased until the week of October 23, when it was 1,010,961 cars, or within 500 cars of the record set by the Railroad Administration for a week in September, 1919. Since October 23 there has been a gradual decline, although the loading figures were larger than during the corresponding weeks of 1919 or 1918, until the week of December 18, and the total ton-mileage for October was slightly less than it was in August, although greater than for any previous month.

"The situation was met," said Commissioner Aitchison in an address made the early part of November, "squarely and courageously, in a business-like way, without political interferences or pressure of any character whatsoever, under the orderly process of law, by privately operated railroads, directed along consistent lines to secure that unity of object and policy that was the end sought in placing the carriers under federal control during the war. The sum total of cars and rolling stock at the termination of federal control was inadequate to meet the strain which was soon placed upon the transportation system. The effect of the strikes and stoppage of traffic which occurred within six weeks after the roads were returned to their owners, was equivalent to the obliteration of one-third of all the rail equipment of the country suitable for freight carrying service. As the result of the unceasing efforts of railroad operators and employees, with the assistance of the shippers, and under the policy laid down by the commission and enforced and carried out in detail by the carriers individually and through their Car Service Division, the back of the car shortage has been broken, and we are now facing the possibility of a surplus of equipment."

The accompanying table, prepared by the Bureau of Statistics of the Interstate Commerce Commission, gives a comparison of significant averages for September, 1920, with the seven months immediately preceding.

Item	Sept.	August	July	June	May	April	March	Feb.	Jan.
Traffic density (net ton-miles per mile of road per day)	5,917	5,995	5,657	5,531	5,292	4,120	5,432	4,901	4,866
Train-load (net ton-miles per train-mile)	767	788	769	758	746	666	725	693	672
Car-load (net ton-miles per loaded car-mile)	30.1	30.1	29.7	29.1	28.3	28.6	28.3	28.3	28.3
Per cent loaded of total car-miles	66.8	68.1	67.7	69.5	71.2	68.4	72.3	71.9	70.8
Car-miles per car-day	28.4	27.5	26.2	25.0	24.3	19.5	23.8	22.3	22.8
Net ton-miles per car-day	568	561	526	505	489	379	495	453	457
Cost per freight train-mile (selected accounts)	$2,102	$2,460	$1,897	$1,879	$1,780	$1,874	$1,793	$1,912	$1,859

ON NEW YEAR'S DAY let us resolve to make 1921 our banner year for efficiency, loyalty and co-operation. We are entering the new year in a period of readjustment which doubtless will continue to affect us for some time. This should not cause discouragement, but rather inspire to greater ambition. Let it be our watchword this year to perform the common duties of each day uncommonly well.—C. S. Krick, general manager, P. R. R., to the employees.

Higher Freight Rates Fail to Curtail Shipping

Increased Passenger and Pullman Charges, However, Have a Restraining Influence on Travel

WHEN THE Interstate Commerce Commission, acting in accordance with the provisions of the Transportation Act, granted the carriers increases in freight and passenger rates amounting to about $1,500,000,000 annually, those unfriendly to the new law predicted that the increased rates would curtail freight and passenger traffic. These increased rates have now been in effect for about four months, and it is possible to "prove up" the results to a limited extent.

The first full month in which the new rates were operative was September. More freight was moved during that month than was ever moved in a single month during the pre-war period, or during federal control. A total of 40,999,843,000 net ton-miles was produced, the third consecutive month in which all monthly records previcus to July, 1920, were broken. In July, 40,232,000,000 net ton-miles and in August, 42,706,835,000 net ton-miles were produced. The decrease between August and September was due to an interruption in industrial activity because of the observance of Labor Day and to the fact that there was one less day in September than in August. Again, in October, the second full month in which the new rates were operative, the net ton-miles produced exceeded all monthly records prior to August, 1920. A total of 42,562,000,000 net ton-miles were produced, the second highest total ever achieved and only 144,835,000 net ton-miles below the record-breaking August total. These statistics indicate that instead of an immediate decrease in freight traffic because of increased charges, the amount of business handled by the railroads remained at a record-breaking level for these two months.

Similar figures for later months are unfortunately not available but there are other statistics by means of which the amount of freight handled after the application of increased tariffs can be shown The number of cars of revenue freight loaded weekly from the time the increased freight rates went into effect to the latest available weekly record are shown in the accompanying Table I.

This table shows that the number of cars of freight loaded each week increased steadily from 947,743 cars during the week ending September 4, the first week after the increased rates went into effect, to 1,010,951 cars during the week ending October 23. This does not indicate that higher transportation charges exerted a restraining influence on the volume of freight offered for movement but rather that it moved independently of these increases.

Early in the fall business experienced a gradually increasing recession. The railroads in common with other industries began to feel the results of this recession early in November when the amount of freight offered for movement decreased materially. This is clearly shown in the car loading records in Table I by a drop from 1,010,951 cars loaded in the week ending October 23, to 910,592 cars loaded in the week ending November 6. As the depression became more general the car loading further decreased, reaching the lowest stage in the week ending November 27, when the number of cars of freight loaded totaled 797,673.

That this decline is not due to increased rates is shown by the fact that (1) if the shipping public had been unwilling to pay higher freight rates, the car loading records would not have increased steadily for almost two months; and, (2), in spite of business depression the amount of freight handled by the railroads after the increased rates were made effective continued to be heavier than in the same period of either 1918 or 1919, as shown in Table I. It may be concluded, then, that such statistics as are now available indicate that increased freight rates have not exerted a restraining influence on the volume of traffic offered to the railroads for movement.

THE SIMULTANEOUS advent of a general business recession and the increased freight and passenger rates resulted in declines in both freight and passenger traffic.

Analysis of the available statistics indicate that, despite the higher charges the volume of freight offered for movement continued heavy until the railroads, in common with other industries, felt the results of the depression.

Higher passenger rates have had a restraining influence on travel.

There is one other factor in support of this conclusion, i. e., there has been no general opposition to higher freight charges, either during the Interstate Commerce Commission's hearings or since their application, except on the part of certain individuals who advocate government ownership. It is logical to assume, then, that if the public is as alive to the necessity for higher transportation charges as it appears to be, commodities and merchandise will be shipped, regardless of higher freight rates, if markets can be found.

TABLE I—CARS OF REVENUE FREIGHT LOADED, BY WEEKS

Week ending	1920	1919	1918
September 4	947,743	904,393	872,560
September 11	872,043	946,970	974,269
September 18	983,913	994,991	970,458
September 25	994,687	987,041	991,980
October 2	975,946	957,596	971,895
October 9	1,009,787	982,171	959,722
October 16	1,005,663	972,078	927,134
October 23	1,010,951	977,051	920,111
October 30	973,120	935,479	892,392
November 6	910,592	826,000	873,000
November 13	919,909	808,000	810,000
November 20	880,528	854,601	857,377
November 27	797,673	739,197	735,628
December 4	872,162	789,286	837,806
December 11	834,897	761,940	820,200

Effect of Increased Rates on Passenger Traffic

In regard to passenger traffic, complete statistics with which to appraise the results are, unfortunately, not yet available. Observation of general conditions, however, leads to the conclusion that increased passenger rates have tended to curtail travel to some extent. This is indicated in Table II, which contains the records of several of the larger passenger carrying roads radiating north, south, east and west from Chicago, and which shows the number of passengers carried one mile in August, September and October, 1920, as compared with the records for the same months of 1919. While it is true that there has always been more or less of a decline in passenger traffic beginning in August and continuing until spring, the records for these representative lines show that this year this decline has been more noticeable than before.

What portion of this larger decline in passenger travel is attributable to the business recession which was taking place during this period is impossible to determine. However, it is known from past experience that general business recessions are reflected in the volume of passenger traffic before they are seen in the records of freight traffic. The periods in which the business recession and the declines in freight and passenger traffic occurred indicate that this was the case and it is therefore impossible to attribute the declines in passenger travel entirely to an unwillingness on the part of the public to pay higher passenger fares.

In other words, there are two factors, namely, business recession and increased rates, which combined have tended to curtail passenger travel. Which has been most instrumental in effecting this decline is not determinable. Yet it can safely be said that the increased passenger tariffs have exerted some influence. This is especially true of sleeping car passengers who pay the 50 per cent surcharge. L. S. Taylor, vice-president of the Pullman Company, recently stated before the Interstate Commerce Commission that the collection of the surcharge, which accrues wholly to the railroads, had considerably reduced the number of passengers riding in sleeping cars. It may be possible that the reductions which have taken place in sleeping car passengers are no larger than the reductions which have taken place simultaneously in the number of coach passengers, but it is probable that the reduction in the number of sleeping car passengers has been greater.

Another factor which supports the conclusion that the higher passenger rates have tended to curtail travel, is that the public has not accepted the passenger rate increases with as good grace as it has accepted the freight rate increases. This is reflected partially in the attitude of the various state commissions, 16 of which have denied comparable increases in intrastate passenger rates, seven of which have allowed increases with exceptions, and two of which have denied comparable increases in part, making a total of 25 commissions which have not agreed with the Interstate Commerce Commission in its findings.

In conclusion, it might safely be said that developments subsequent to the Commission's rate award indicate, (1) that increased freight rates have had little influence on the amount of freight offered for movement, and (2) that increased passenger rates have had an unfavorable effect on passenger travel to an extent still undetermined.

TABLE II—PASSENGERS CARRIED ONE MILE

Months	New York Central		Illinois Central*		Atchison, Topeka & Santa Fe		Chicago & North Western	
	1920	1919	1920	1919	1920	1919	1920	1919
August	333,298,424	303,494,098	104,406,410	107,502,809	211,626,359	156,756,916	149,465,332	137,990,037
September	306,327,881	283,403,310	90,869,561	99,864,463	187,207,563	155,963,871	131,855,022	134,444,506
October	255,917,204	246,664,670	79 877,680	95,688,413	185,314,264	150,469,111	113,507,496	121,760,161
Per cent decrease	23.2	18.7	23.4	11	12.4	4	24	11.07

*Figures do not include suburban traffic.

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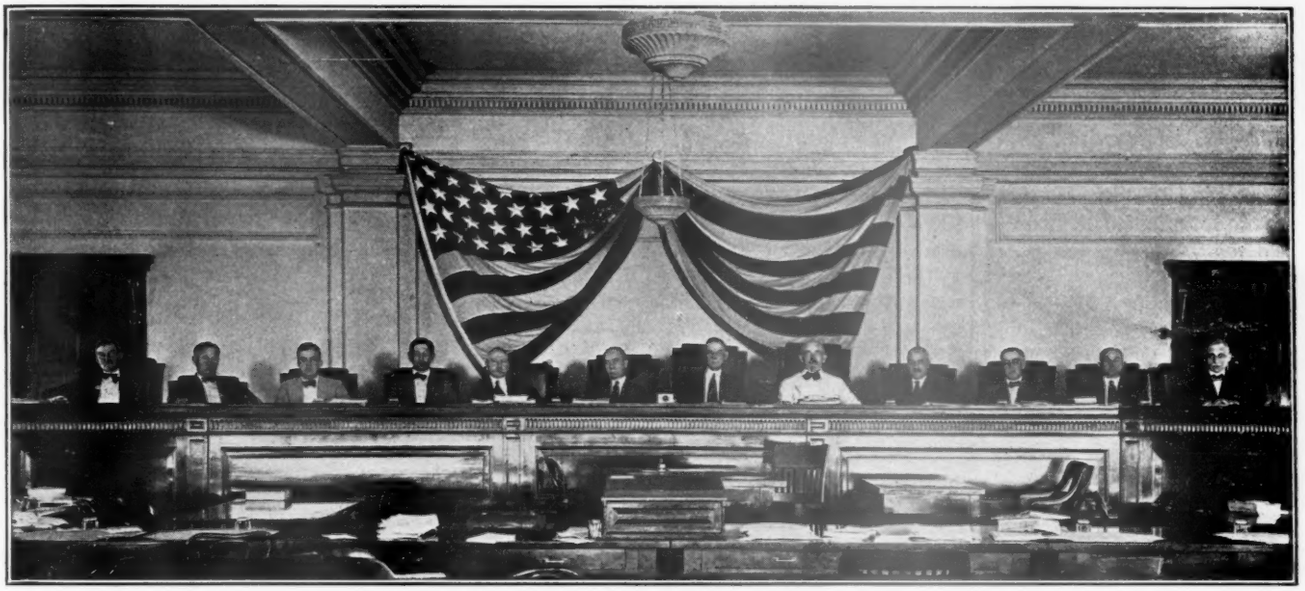
An Aerial View of the Yards at Cologne, Built During the War



The I. C. C., with Three State Commissioners, Hearing the General Rate Advance Case. Left to right: J. A. Guiher, Mark W. Potter, J. B. Eastman, C. B. Aitchison, H C. Hall, C. C. McChord, E. E. Clark (chairman), B. H. Meyer, W. M. Daniels, H. J. Ford, R. C. Dunn, W. D. B. Ainey. (Robert W. Woolley missing).

Effect of the Rate Increases Disappointing

So Many Uncertain Factors Are Involved That It Is Impossible to Predict Final Result

THE UNPRECEDENTEDLY LARGE increases in freight and passenger rates which became effective on August 26 as the result of the Interstate Commerce Commission's decision in Ex Parte No. 74, have failed thus far to produce the desired and expected effect on either the operating revenues or the net operating income of the railroads as a whole.

In September the full effect of the increases in rates was not shown because a large volume of traffic was handled by the railroads during that month that was billed during the previous month at the old rates and also because the full amount of the increases was not allowed in many states as to intrastate traffic. In October and November the same condition continued as to state rates and by November the amount of traffic had fallen considerably below what had been anticipated at the time the increases in rates which would be necessary to produce a 6 per cent return were calculated. The Interstate Commerce Commission has now rendered several decisions ordering increases in state passenger fares corresponding to the advances made in interstate rates, but it has not yet passed on any of the state rate cases involving the refusal of the state authorities to allow increases in freight rates for intrastate traffic.

Complete statements of the earnings and expenses of the railroads for September and October have now been available for some time and the individual statements of many roads for November are now at hand. While it would be futile to base any predictions as to the results to be expected for a full year on the experience for two or three months during which conditions were changing so rapidly and at a time when the outlook is so uncertain as to the future course of either traffic or expenses, some tentative conclusions of interest may be drawn from the results of two months during which the freight traffic was greater than had ever before been handled in corresponding months and when passenger traffic, although showing a slight reduction, was at least not below normal.

COMPLETE STATEMENTS of the earnings and expenses are available only for the months of September and October.

A large amount of business handled during September was billed at the old rates.

The full amount of the rate increases has not been granted on intrastate traffic by some states.

Business fell off in November considerably below what had been anticipated when the rates to produce 6 per cent return were calculated.

The increase in freight rates was 40 per cent in the Eastern district, 25 per cent in the Southern district, 35 per cent in the Western district, 25 per cent in the Mountain-Pacific district, and 33 1-3 per cent for interterritorial traffic. It was estimated that the average increase for the railroads as a whole should have been about 34 or 35 per cent. The increase in passenger rates was 20 per cent and there was also a surcharge of 50 per cent of the rates for Pullman traffic to accrue to the railroads.

September Results

In September, 5 per cent more ton-miles of freight were handled than in September, 1919. An increase of 35 per cent in rates, therefore, should have produced something

like a 40 per cent increase in freight revenues. The increase was, however, only 26.2 per cent. A change in the character of the traffic handled might have made some difference, but most of the failure to realize the full percentage of increase in September must undoubtedly be attributed to the very large volume of freight offered to the railroads in the week before the new rates went into effect.

The volume of passenger traffic in September, 1920, was slightly less than in September, 1919. The passenger earnings increased 17.4 per cent, the failure to reflect the full percentage of increase being doubtless attributable principally to the effect of the old rates in many states. The total operating revenues in September were 23.6 per cent greater than those for September, 1919. Mail revenue increased 82.6 per cent, but express revenue decreased 13.5 per cent, and all other revenue increased 23.1 per cent.

The increase in total operating revenues was about $117,000,000, but operating expenses showed an increase of $111,000,000, or 27.9 per cent, while taxes increased 41.4 per cent, and the net operating income for the month, $75,310,311, was 3 per cent less than the net operating income in September, 1919, under the old rates. This represented about the amount which the railroads had been guaranteed per month by the government for the preceding 26 months, but it fell considerably short of enough to produce a 6 per cent return. On the basis of the experience of the three-year test period prior to federal control the net operating income for September should be approximately 10.11 per cent of that for a full year, and that percentage of a 6 per cent return for the Class I roads would be $112,708,800. The shortage for the month, therefore, was $34,000,000, which can not be made up except by abnormally large earnings in some other month. However, about $2,700,000 of back wages was charged to the September account which belongs to earlier months.

The Eastern roads in September fared slightly better than did the roads as a whole as compared with September, 1919. Their net operating income was $26,110,597, a decrease of 2.5 per cent, but to earn 6 per cent a year on the valuation ascribed to them by the commission they should have earned $47,000,000. Their freight revenues increased 31.3 per cent and their passenger revenues 21.1 per cent, while total operating revenues increased 27.8 per cent and operating expenses 31.2 per cent.

The Southern roads had an increase in freight revenues of 29.3 per cent, or more than the percentage of rate increase applied to their district, but passenger revenues increased only 17.9 per cent and total operating revenues 25.7 per cent. However, their operating expenses were only 24 per cent greater than in September, 1919, and their net operating income was $9,615,340, an increase of 78.3 per cent. Their net operating income for September, however, to produce a 6 per cent return, should have been about $15,000,000.

The roads of the Western district had an increase of only 19.8 per cent in freight revenues, 13.4 per cent in passenger revenues and 18.3 per cent in total revenues, while their expenses increased 25.4 per cent, and their net operating income, $39,584,374, was 13 per cent less than that for September, 1919. The Western roads should have earned about $46,000,000.

October Results

For October the net operating income was larger than September, $86,455,487, an increase over October, 1919, of 13.3 per cent, but the roads should have earned in October $112,708,000, or 10.4 per cent of a year's net income. Total operating revenues increased by $132,000,000, or 26 per cent, but the operating expenses increased $120,000,000, or 29.7 per cent. Taxes had also increased by 35 per cent. Freight revenues increased only 30.5 per cent, although the freight ton-miles had increased nearly 6 per cent, and passenger revenues increased 15.2 per cent. There had been, however, a slight decrease in passenger traffic.

The Eastern roads in October had a net operating income of $30,128,416, as against $48,840,000 which they should have earned to produce October's proportion of a 6 per cent return on their valuation. This was an increase of 27.2 per cent, however. Their freight earnings showed an increase of 38.1 per cent over October, 1919, and passenger earnings 21.8 per cent. The roads of the Southern district had a net operating income of $10,998,230, an increase of 20.2 per cent, but nearly $5,000,000 less than the October proportion of a 6 per cent return. Their freight revenues increased 26.9 per cent, but passenger revenues increased only 9.8 per cent. The Western roads had a net operating income of $45,328,841, as against $48,000,000 which they should have earned. The increase was 4.3 per cent over 1919. The freight revenues increased 23.8 per cent and passenger revenues only 10.7 per cent.

The general slump in traffic which has been so noticeable throughout November and December had begun as far back as October or September, although it was not sufficient to show in the total figures until the first part of November. As there has been a falling off for some time in miscellaneous and manufactured freight which pays comparatively high rates, the failure to realize the expected percentages

REVENUES AND EXPENSES OF STEAM ROADS—SEPTEMBER, 1920

Account	United States 1920	United States 1919	United States Increase over 1919 Per cent	Eastern District 1920	Eastern District 1919	Eastern District Increase over 1919 Per cent	Southern District 1920	Southern District 1919	Southern District Increase over 1919 Per cent	Western District 1920	Western District 1919	Western District Increase over 1919 Per cent
Total operating revenues	$616,200,796	$498,611,917	23.6	$284,583,984	$222,710,194	27.8	$89,305,640	$71,019,329	25.7	$242,311,172	$204,882,394	18.3
Freight	437,657,926	346,668,124	26.2	201,030,182	153,071,000	31.3	64,913,234	50,207,210	29.3	171,714,510	143,389,914	19.8
Passenger	129,438,552	110,219,099	17.4	59,007,206	48,721,493	21.1	18,595,167	15,769,959	17.9	51,836,179	45,727,647	13.4
Total operating expenses	511,482,960	399,904,137	27.9	244,960,457	186,680,484	31.2	77,894,997	62,814,071	24.0	188,627,506	150,409,582	25.4
Net operating revenue	104,717,836	98,707,780	6.1	39,623,527	36,029,710	10.0	11,410,643	8,205,258	39.1	53,683,666	54,472,812	d 1.4
Net operating income	75,310,311	77,648,722	d 3.0	26,110,597	26,774,698	d 2.5	9,615,340	5,393,937	78.3	39,584,374	45,480,087	d13.0
Operating ratio—per cent	83.01	80.20	....	86.08	83.82	....	87.22	88.45	....	77.85	73.41	....

d—Decrease.

REVENUES AND EXPENSES OF STEAM ROADS—OCTOBER, 1920

Account	United States 1920	United States 1919	United States Increase over 1919 Per cent	Eastern District 1920	Eastern District 1919	Eastern District Increase over 1919 Per cent	Southern District 1920	Southern District 1919	Southern District Increase over 1919 Per cent	Western District 1920	Western District 1919	Western District Increase over 1919 Per cent
Total operating revenues	$642,135,312	$509,760,115	26.0	$293,221,671	$222,535,379	31.8	$93,360,749	$76,301,726	22.4	$255,552,892	$210,923,010	21.2
Freight	480,839,394	368,546,313	30.5	220,308,900	159,520,941	38.1	70,609,437	55,641,272	26.9	189,921,057	153,384,100	23.8
Passenger	114,044,152	99,033,423	15.2	50,442,666	41,430,561	21.8	17,045,062	15,529,522	9.8	46,556,424	42,073,340	10.7
Total operating expenses	526,578,888	405,879,309	29.7	249,031,003	186,887,904	33.3	79,773,678	64,452,020	23.8	197,774,207	154,539,385	28.0
Net operating revenue	115,556,424	103,880,806	11.2	44,190,668	35,647,475	24.0	13,587,071	11,849,706	14.7	57,778,685	56,383,625	2.5
Net operating income	86,455,487	76,294,127	13.3	30,128,416	23,680,353	27.2	10,998,230	9,148,343	20.2	45,328,841	43,465,431	4.3
Operating ratio—per cent	82.00	79.62	....	84.93	83.98	....	85.45	84.47	....	77.39	73.27	....

d—Decrease.

of increase in freight revenue may be due to an increasing proportion of low-rated traffic.

The November earnings have not yet been reported by a sufficient number of roads to make a representative showing. While they are showing large increases in net as compared with November, 1919, this is attributed largely to the fact that the November, 1919, reports were considerably affected by the coal strike.

The principal items in the September and October reports for the roads as a whole and by districts are given in the accompanying tables.

Effect on Individual Roads

An analysis of the effect of the new rates on the earnings of individual roads would require a complicated study to show the proportion of a year's net income that they should earn in September and October and of the comparative volume of traffic, while the valuation figures on which the 6 per cent return is to be figured have not yet been determined. For some roads the results seem to have been very satisfactory, but for others the results are very disappointing. A good many roads had suffered a decrease in traffic.

For September, 21 of the roads having annual operating revenues in excess of $25,000,000 had less net operating income than they did in September, 1919, under the old rates. These were the Boston & Maine; Cleveland, Cincinnati, Chicago & St. Louis; Erie; Lehigh Valley; Michigan Central; New York Central; New York, New Haven & Hartford; Pere Marquette; Pittsburgh, Cincinnati, Chicago & St. Louis; Atlantic Coast Line; Southern; Atchison, Topeka & Santa Fe; the Chicago & North Western; Chicago, Milwaukee & St. Paul; Chicago, Rock Island & Pacific; Minneapolis, St. Paul & Sault Ste. Marie; Missouri Pacific; Oregon Short Line; Oregon-Washington Railroad & Navigation Company; Texas & Pacific, and Union Pacific. The Boston & Maine, Pittsburgh, Cincinnati, Chicago & St. Louis, Atlantic Coast Line, and the Oregon-Washington Railroad & Navigation Company had deficits.

In October there were 18 roads that earned less for net than they did the year before. The Lehigh Valley; Pittsburgh, Cincinnati, Chicago & St. Louis; Atlantic Coast Line; Southern; Chicago & North Western; Missouri Pacific; Texas & Pacific, and Union Pacific, that in September earned less than a year before, in October had increases as compared with October, 1919, but the Wabash; Louisville & Nashville; Chicago, Burlington & Quincy; Great Northern, and Southern Pacific, that had had increases in September, had decreases in October. None of the larger Class I roads having annual revenues exceeding $25,000,000, however, had deficits in October.

Settlements With the Railroad Administration

Slow Progress Being Made—More Than 11,000 Claims Presented —Settlements with 20 Companies

EIGHTY-SEVEN RAILROADS and transportation companies have now filed their complete claims with the Railroad Administration for a final settlement of their accounts with the government arising from the period of federal control. Settlements have been made with 20 companies and negotiations have been well advanced with a large number of others. A large number of additional roads are expected to submit their claims in the early part of the year but some of the larger systems, whose accounts are especially complicated, are making extensive studies of the condition of their properties and do not expect to be able to present their claims for nearly a year.

Among the larger roads that have filed claims but have not yet begun their negotiations for a settlement with the Railroad Administration are the Great Northern, Northern Pacific, Missouri Pacific, Southern, Chicago, Rock Island & Pacific, St. Louis-San Francisco, Pere Marquette and Atlantic Coast Line.

The Railroad Administration has recently announced that it has reached final settlements and paid out to the several companies the following amounts:

Abilene & Southern	$150,000.00
Buffalo, Rochester & Pittsburgh	1,000,000.00
Cincinnati, Indianapolis & Western	400,000.00
Spokane, Portland & Seattle	1,600,000.00
Fort Dodge, Des Moines & Southern	300,000.00
El Paso Union Passenger Depot	5,665.86
Sioux City Bridge Company	98,546.92
Northwestern Pacific	525,000.00
Mississippi Central	220,000.00
Louisiana & Mississippi Railroad & Transfer	33,231.81
Chicago, Milwaukee & St. Paul	13,750,000.00
St. Louis National Stock Yards	100,000.00
Eastern Steamship Lines	250,000.00
Rio Grande Southern	105,000
Midland Valley	550,000
Bennettsville & Cheraw	29,500
Clyde Steamship Company	162,224
Chesapeake Steamship Company	62,303
Des Moines Terminal Company	15,500
Fort Worth Belt	75,000

The Gulf, Mobile & Northern also effected a settlement by which it agreed that it owes the government $100,000.

The payment of claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroads and the administration during the 26 months of federal control.

The Railroad Administration has not made public the amounts of the claims against it nor of its counter-claims against the railroads but it is understood that some of the larger claims are as follows: Chicago & North Western, $45,586,030; Great Northern, $29,827,000; Southern, $84,700,000; Pullman Company, $24,422,264.

The administration has also made a claim against the Southern for $71,650,000.

All claims include items for money due on a regular statement of account, including that due for rental, and in the case of roads that have not signed contracts with the Railroad Administration, they usually include a claim for special compensation in addition to the standard return. The largest items in the claims of the railroads are for undermaintenance of way and structures and equipment and for materials and supplies, and there are counter-claims by the government on the same accounts. Most roads owe the government for additions and betterments made during federal control and there are claims by most roads against the government for losses in connection with additions and betterments made for war purposes or for other purposes for which the railroads claim they should not pay. To December 1 a total of 11,239 of such claims had been presented, of which a large proportion have been adjusted or are in process of settlement.

The Chicago & Eastern Illinois has taken its claim for compensation for the period of federal control to the court of claims but has since received an offer of settlement from the Railroad Administration.

Two Important Valuation Developments in 1920

Kansas City Southern Decision and Transportation Act Create New Conditions—Field Work Nearly Ended

THE TWO OUTSTANDING developments in valuation work during 1920 were the decision of the United States supreme court in the Kansas City Southern case and the recognition of valuations as a basis for the returns to the carriers in the Transportation Act. In the Kansas City Southern decision, handed down on March 8, the supreme court of the United States sustained the contention of the railways that the Valuation Act requires the Interstate Commerce Commission to ascertain and report "the present cost of condemnation and damages or of purchase in excess of present value" of common carrier lands. The Transportation Act of 1920 expressly stipulates that the return to the carriers shall be fixed at a specific rate of return on the value of their properties as determined by the Commission from time to time. While efforts have been made during 1920 to complete the inventories of carriers' properties, the effect of the Kansas City Southern decision has been to prevent the fixing of a final value upon any property as yet and to hold up the service of other tentative valuations until the data called for with respect to land can be collected.

UNITED STATES supreme court decision in Kansas City Southern case made it necessary for the Commission to revise its methods of valuing land. Field work completed in all districts except the Eastern. Accounting department has suffered severely from shortage of experienced employees but this is now being relieved. Many engineering, land and accounting reports should be completed this year.

Recognition of valuation in Transportation Act gives new incentive for completion of work.

Progress in Inventory Work

Prior to January 1, 1920, the field work had been completed in the Southern district and had practically been completed in the Central, Western and Pacific districts, while a considerable amount of work still remained to be done in the Eastern district. During the year this field work was completed in all districts except the Eastern where, by reason of the more complicated conditions, it is still under way in all branches and it is not expected that it will be completed until late in 1921. The Division of Valuation is now concentrating attention on the completion of engineering reports on those roads 500 miles or more in length and it is expected that these reports will be completed on most of these roads during this year.

Up to the present time the work of the land department has not kept pace with that of the engineering section, but that work is now being expedited. With certain changes in methods which are now being developed, it is expected that most of the field work will have been completed in all districts other than the Eastern by July 1, while the latter district with its larger number of cities with their more extensive terminal properties will require several months additional.

The greatest difficulty has been encountered in promoting the work of the accounting department. Owing to the impossibility of retaining adequate efficient forces with the salaries in effect early in the year, it frequently happened that 25 per cent of the entire force in an office changed in a single month. From January 1, 1918, to June 30, 1920, there was a turnover in employees in the accounting department of more than 70 per cent, while on the latter date the accounting section had only about 70 per cent of its quota of authorized employees. However, salaries were advanced somewhat about July 1, since which time the forces have been on a somewhat more stable basis and are now recruited to

practically their quota. It is therefore expected that the work of the accounting department will be brought up rapidly so that many engineering, land and accounting reports will be served on the carriers during the early months of this year.

Present Status of Valuations

Prior to November 6, 1919, the Interstate Commerce Commission had served 55 tentative valuations on the carriers, of which 9 were on Class I and 14 on Class II roads. Since that date, following the filing of the Kansas City Southern case, further serving of tentative valuations was held up awaiting the decision; since the over-ruling of the contention of the Division of Valuation by this decision on March 8, 1920, no further tentative valuations have been served, although engineering reports have since been submitted to 41 other Class I roads and land reports also to 29 of these roads. The Interstate Commerce Commission itself has not yet handed down any final valuations, and the so-called valuations which were reported for the Texas Midland, the Kansas City Southern and the Winston-Salem Southbound (without, however, including a single sum value) must now

COMPARISON BETWEEN COST OF REPRODUCTION NEW, PRESENT VALUE OF CARRIER LAND AND *INVESTMENT IN ROAD AND EQUIPMENT AS SHOWN ON CARRIERS' BOOKS OF CLASS I CARRIERS

	Miles of road	Cost new	Land	Cost new and land	Investment in R. & E.
Tentative valuations (9)	4,688	$222,309,428	$20,285,397	$242,594,825	$344,579,273
Preliminary reports (41)	47,165	2,633,732,084	327,455,634	2,961,187,718	2,813,695,883
Grand total (50)	51,853	$2,856,041,512	$347,741,031	$3,203,782,543	$3,158,275,156

*As of date of valuation, figures extracted from I. C. C. Statistics of Railways.

EASTERN GROUP. CLASS I CARRIERS

Tentative Valuations

Carrier	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
Elgin, Joliet & Eastern System	$36,418,605	$3,386,896	$39,805,501	$38,683,120	227
Chic., T. H. & S. E.	22,247,890	1,017,415	23,265,305	24,927,762	363
Preliminary Reports					
Ann Arbor System	$12,857,069	$683,720	$13,540,789	$18,741,167	354
Bangor & Aroostock	24,784,867	615,563	25,400,430	23,363,164	574
Boston & Maine System	231,775,788	44,752,340	276,528,128	195,903,526	2,295
Montpelier & W. R.	1,937,229	75,551	2,012,780	1,124,320	42
Central New England	15,483,002	1,911,772*	17,394,774	22,342,396	136
Hartford, Conn., West	5,037,461	669,632*	5,707,093	4,386,613	124
C. & E. I.	72,331,056	5,420,799	77,751,855	78,990,280	1,225
C., I. & L.	27,782,784	2,122,271	29,905,055	37,225,990	509
C., C., C. & St. L.	143,779,304	15,490,541	159,269,845	144,375,812	1,687
Maine Central System	64,925,379	2,214,567*	67,139,946	54,983,162	1,132
Portland Terminal	5,253,647	2,601,268	7,854,915	5,138,223	23
N. Y., N. H. & H.	248,599,023	71,000,000*	319,599,023	195,505,844	1,252
T., St. L. & W.	16,746,019	1,700,149	18,446,168	39,381,687	450
Pere Marquette	65,324,361	4,603,567	69,927,928	87,100,297	1,792
Vandalia	42,351,590	6,060,896	51,858,294	36,366,572	651
Terre Haute & Peoria	3,445,808			6,267,319	138
Total: 18 valuations and preliminary reports	$1,041,080,882	$164,326,947	$1,205,407,829	$1,014,807,254	12,974

*Carriers' Return to Order No. 7.

SOUTHERN GROUP. CLASS I CARRIERS

Tentative Valuations

Carrier	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
A., B. & A. System	$25,114,141	$2,357,676	$27,471,817	$39,255,787[1]	663
Geo. Sou. & Florida	10,297,657	1,231,456	11,529,113	12,273,374	392
Norfolk Southern System	24,076,990	3,010,888	27,087,878	30,617,459	902
Winston-Salem Southbound	5,428,444	510,655	5,939,099	5,598,558	90
Preliminary Reports					
Central of Georgia	$62,252,124	$11,357,324	$73,609,448	$62,003,324	1,489
Southwestern R. R.	9,170,145	1,769,732	10,939,877	5,191,100	333
Charleston & West. Car.	9,814,315	1,875,745	11,690,060	8,279,563	341
Florida East Coast	43,557,372	4,409,548	47,966,920	48,207,859	739
Mobile & Ohio	47,027,163	3,908,595	50,935,758	45,897,658	923
N. C. & St. L. Sys.	56,309,554	4,857,487	61,167,041	42,066,246	1,100
New Orleans Great Nor.	7,298,789	208,825	7,507,614	16,045,669	243
Southern Ry. in Miss.	4,881,786	564,783	5,446,569	610,656	237
Gulf & Ship Island	9,498,259	1,354,196	10,852,455	14,170,083	308
Ga. R. R. & Bank, inc. Ga. R. R. (Lessee org.)	14,041,901	102,493	14,144,394	5,430,000	301
Total: 14 tentative valuations and preliminary reports	$328,768,640	$37,519,403	$366,288,043	$335,647,336	8,061

[1]Investment as of December 31, 1915, after reorganization—taken from I. C. C. Statistics.

WESTERN GROUP. CLASS I CARRIERS

Tentative Valuations

Carrier	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
New Orleans, Tex. & Mex.	$8,865,636	$141,686	$9,007,322	$15,780,645	173
Kansas City Southern Sys.	46,732,105	4,530,642	51,262,747	101,050,970	879
San Pedro, Los A. & S. L.	43,127,960	4,098,083	47,226,043	76,391,598	999
Preliminary Reports					
Arizona Eastern (inc. Phoenix & Eastern)	$12,178,415	$778,654	$12,957,069	$19,227,648	374
Rock Island System	342,830,396	45,770,812	388,601,208	341,401,305	7,686
Grand Canyon Ry.	1,365,674	6,267	1,371,941	1,988,785	64
M., St. P. & S. S. M.	108,066,929	6,634,182*	114,701,111	116,953,635	3,144
Northwestern Pacific	37,461,314	691,879*	38,153,193	65,984,697	506
Duluth, South Shore & Atl.	19,231,742	939,096	20,170,838	48,167,021	539
Mineral Range R. R.	3,230,437	113,582*	3,344,019	3,317,151	64
St. Louis Southw'n Sys.	60,845,317	5,823,190	66,668,507	94,250,627	1,579
Spokane, Port. & Seattle	55,906,902	6,093,285*	62,000,187	61,266,414	498
Texas & Pacific	66,290,979	1,127,432*	67,418,411	109,250,903	1,853
Trinity & Brazos Valley	10,528,256	499,638	11,027,894	11,792,807	303
Western Pacific	60,817,087	6,122,412	66,939,499	86,985,845[1]	939
Great Northern	378,204,335	40,000,000	418,204,335	384,273,853	7,090
O.-W. R. R. & N. Co.	123,490,128	19,857,000*	143,347,128	156,642,559	1,999
Oregon Short Line	107,018,378	2,666,841*	109,685,219	113,094,103	2,129
Total: 18 valutions and preliminary reports	$1,486,191,990	$145,894,681	$1,632,086,671	$1,807,820,566	30,818

*Carriers' Return Order No. 7. [1]Investment as of December 31, 1917, after reorganization—taken from I. C. C. Statistics.

be withdrawn and revised by the Commission in order to bring them into compliance with the decision in the Kansas City Southern case.

Comparisons Between Cost of Reproduction New and Investment in Road and Equipment Accounts

As the work of the Division of Valuation approaches a point where comparisons can be made between its figures and the carriers' records of investment in road and equipment, intense interest is naturally being manifested in these returns. In testifying before the Interstate Commerce Commission in the rate hearing on May 26 and 27, 1920, Thomas W. Hulme, vice-chairman of the President's Conference Committee on Valuation, presented comparisons between the cost of reproduction new, including the present value of carrier land as reported by the Division of Valuation, and the investment in road and equipment as shown on the carriers' books of Class I roads (shown in the accompanying table). Of the 9 Class I roads with an aggregate of 4,688 miles of road on which tentative valuations have been served, the cost of reproduction new plus the present value of land totaled $242,594,895 as compared with the carriers records of investment in road and equipment of $344,579,273, or a decrease of $101,984,448. On the other hand, in the 41 preliminary engineering and land reports covering 47,165 miles of lines, the aggregate cost of reproduction new plus the present value of land was $2,961,187,718 while the investment in road and equipment was $2,813,695,883 or an excess of $147,491,835.

In view of these figures, which were based on 1914 prices, Mr. Hulme concluded that: "When one takes into consideration the fact that the first roads for which the government undertook its valuation work were either small roads, selected for the purpose of testing out proper methods, or were roads that were then in the hands of receivers or had recently been in the hands of receivers, or been subject to reorganization, and compares the results obtained from the earlier investigations with the results obtained from the preliminary reports of roads that have gotten along very well, but in which there are included but a few of the larger railroad systems of the country, one will naturally conclude that as the stronger and bigger systems are reached, the total of the reports as to cost of reproduction on the 1914 prices and the land values ascertained under the methods used by the Commission, will produce results considerably in excess of the road and equipment accounts."

If valued on more recent prices this comparison would be even more favorable, Director Prouty of the Division of Valuation stating before the Commission in January, 1920, that he had reported to the director general of railroads that the costs in 1918 were approximately 175 per cent greater than those of 1914. Later studies indicate that similar costs in the latter part of 1919 and the early part of 1920 are about 212 per cent of the 1914 costs.

In respect of the financial status of the Bureau of Valuation, Director Prouty stated recently before the appropriations committee of the House of Representatives in connection with the request of the Commission for an appropriation of $2,000,000 for the valuation work for the fiscal year 1922, that the current appropriation for the bureau is $1,750,000 but that it is now spending at the rate of $2,750,000 a year, or $225,000 a month. This rate of expenditure, he said, would probably continue for the balance of the fiscal year. For the first six months of the next fiscal year, that is, the last half of the calendar year 1921, an expenditure of $200,000 a month would be sufficient and for the second half of the fiscal year it would be necessary to expend approximately $200,000 to keep the valuation up to date and about $100,000 a month for original valuation work.

The Kansas City Southern Decision

As the state commissioners have supported the Division of Valuation in its position that it was impossible to report intelligently the present cost of condemnation and damages or of purchase in excess of present value of common carrier lands required in the Valuation Act and that, if reported, this information would be of no practical significance, it is not surprising that the National Association of Railway and Utilities Commissioners began to agitate the amendment of the Valuation Act to eliminate this requirement as soon as the full effect of the Kansas City Southern case was realized. As a result of their efforts, Senator Cummins and Congressman Esch introduced bills in their respective houses of Congress last year to effect the desired change. Owing to the adjournment of Congress shortly after their introduction no hearings have yet been held on these bills. The passage of this amendment was strongly urged at the recent convention of the National Association of Railway and Utilities Commissioners.

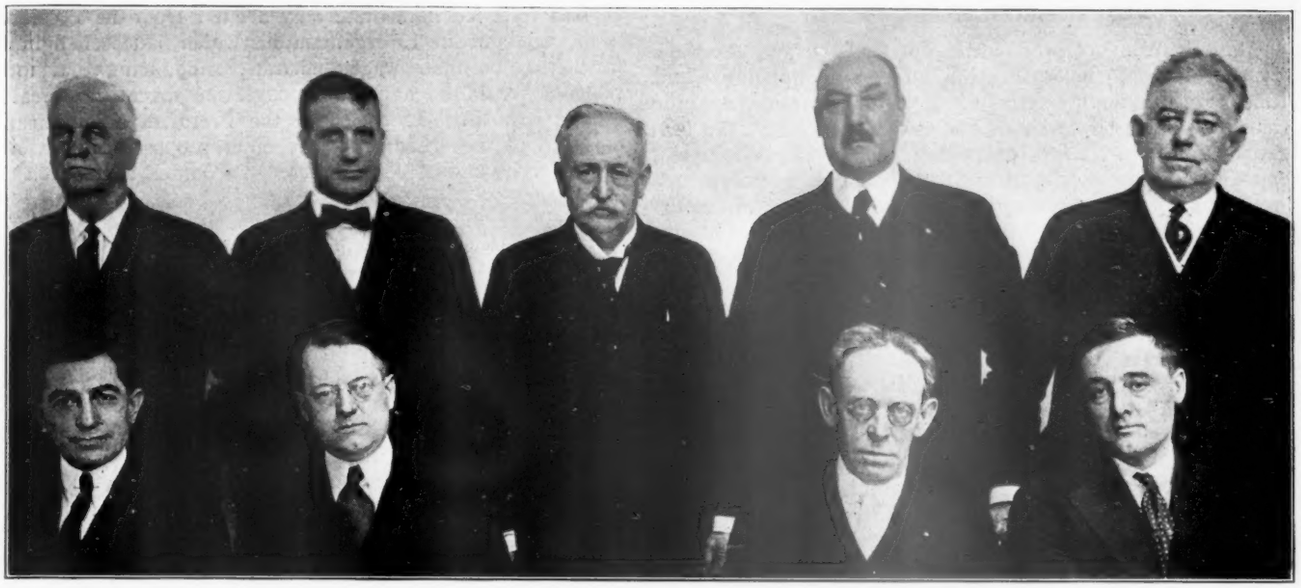
Conclusion

The work of valuation has now been transferred almost entirely from the field to the office. The Division of Valuation has undertaken certain basic studies and collected general information preliminary to reporting the cost of land as required by the Valuation Act. With this information at hand the Division of Valuation will be in a position to complete a large number of reports during the year for transmission to the Commission.

It now remains for the Interstate Commerce Commission to complete these reports in form for service on the carriers prior to the determination of their final value. As stated above, the provision in the Transportation Act stipulating that the present rate of return shall be effective only until March, 1922, makes it of great importance that the Commission shall be more fully informed at that time regarding the valuation of the properties of the carriers in order that it may then fix their rate of return more intelligently and accurately.

Further importance is attached to the completion of this valuation work by the provision in the Transportation Act requiring carriers to return to the government one-half of all that they earn over six per cent, for without a valuation of its property it is doubtful whether any railroad will be willing to accept an arbitrary figure as a basis on which this six per cent should be computed. It is therefore to the mutual interest of the roads and the government that this work be completed at the earliest possible date. In an effort to bring this about it has been suggested that in the Eastern district, where the work is most seriously delayed, the roads assist the Commission to complete inventories on the Commission's own basis and without prejudice to their decision.

LET US FACE 1921 with hope, confidence, courage and work. We have had innumerable drawbacks, but by expediting train movement, as well as speeding up the repairs to bad-order cars, and with the cordial co-operation of our patrons increasing the loading and decreasing the time consumed in loading and unloading cars, we have been able to handle with reasonable efficiency the business offered, and are prepared to go into the new year confident that the difficulties of the past will solve the problems of the future. To the public, I wish to express my appreciation of its understanding of our trials, and I pledge myself to continue to do the best that can be done with all we have. To those retiring officers and employees whose lives of service entitle them under our rules to well-merited pensions, I give the thanks of the company for their faithful efforts, and express the hope that the rest which they have earned may be filled only with happiness.—New Year's Greeting from N. D. Maher, president, Norfolk & Western.



Railroad Labor Board. Top row, left to right: Horace Baker, Albert Phillips, R. M. Barton, chairman; W. L. Park, J. H. Elliott. Bottom row, left to right: A. O. Wharton, G. W. W. Hanger, J. J. Forrester, H. T. Hunt.

Labor Faces Economic Readjustments in 1921

Post-War Reconstruction Indicates a Change This Year in the Problem of the Railway Employee

ORGANIZED RAILROAD LABOR was very busy during 1920. Much was demanded by the carriers and some classes of labor responded well. But labor's "busyness" was not confined to the rendering of service. It was due largely to efforts to: (1), get the highest wages possible before the inevitable economic readjustments came; (2), unite the various railway brotherhoods in order to present a solid front in all controversies and to strengthen their weapon—the strike; (3), combat unrest and dissension in their own ranks; (4), throttle the growth of the new "outlaw" organizations; (5), dictate the actions and complexion of Congress; and (6), perpetuate the rules and working conditions favorable to labor obtained during the period of federal control.

Labor was successful, either wholly or in part, in its efforts toward the first four goals. It failed to reach the fifth. Whether it will reach the sixth is still undecided. From the employees' viewpoint, therefore, labor had a good year, but labor, like all economic factors, is subject to the law of action and reaction. The reaction has without doubt started.

ORGANIZED railroad labor, after a year of success in obtaining higher wages and promoting unity, faces the inevitable economic readjustments connected with post-war business reconstruction in 1921.

The railroads face easier labor conditions, increased individual efficiency and a return to "an honest day's work for an honest day's pay" basis.

Attitude and action of Railroad Labor Board will have a large influence upon a mutually satisfactory adjustment of the differences.

The conditions prevailing at the time of the return of the railways to private operation were such that the carriers could only "carry on" until the application of the labor provisions of the Transportation Act proved them either successful or unsuccessful. Insofar as opposition to certain of the organization movements is concerned, the carriers have for some time seen that the economic readjustment taking place throughout the country could not but affect the railroad labor problem, and their attitude consequently has been partly due to faith in the eventual return to "an honest day's work for an honest day's pay." As the year closed this faith began to be justified.

When the railroads were taken over by the government in December, 1917, there were pending wage demands of the various classes of employees amounting to about a billion dollars annually. The necessity for solving the labor problem was given by the President as one of the reasons for the institution of federal control, and it was "solved" by granting wage increases totaling over a billion dollars, by adding about 250,000 employees to the payroll, by extending the principles of the eight-hour day and time and one-half for overtime to almost all classes of employees, by abolishing piece work and bonus systems, by strengthening organized railroad labor through negotiating wages and rules only with brotherhood representatives, by consummating national agreements as to working conditions with several of the larger organizations, and by largely destroying the morale and efficiency of the individual worker through centralized control, standardization of wages and working conditions, and disruption of wage differentials built up by years of negotiation.

Labor Developments in 1920

The salient labor developments during 1920 were the wage awards made by the Railroad Labor Board, appointed and functioning under the terms of the Transportation Act, the trend of the larger brotherhoods toward unity and the dissatisfaction and unrest prevailing among the employees, expressed in part by the unsuccessful yardmen's strikes.

During the first two months of 1920—the last two months of federal control—the labor organizations were primarily engaged in attempting to defeat the passage by Congress of the Esch-Cummins Bill, and in urging the passage of the Sims Bill (Plumb Plan). During the period in which new railroad legislation was under consideration by Congress many threats of political action against representatives and senators voting for the Esch-Cummins Bill were made. In addition, threats of strikes were made; a general strike of members of the United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers was called for February 17, and members of the Brotherhood of Railroad Trainmen were asked to vote on a proposed walkout. Unlike its attitude at the time of the passage of the Adamson law in 1916, Congress refused to be coerced and the labor campaign against the Transportation Act failed.

Labor Demands Action on Its Requests for Wage Increases

Meanwhile, brotherhood leaders had been carrying on a vigorous fight for action on the billion dollar wage demands which had first been presented during the preceding summer and fall. Beginning early in February a series of conferences between Director-General Hines and leaders of the brotherhoods were held, resulting in the director-general's decision on February 11 that the advances in question should not be granted in view of the approaching termination of federal control.

The director-general's report and decision were referred to President Wilson, who informed the labor leaders of the "unalterable position of the government." The President contended that a temporary basis of living costs ought not to be made the occasion for a permanent wage increase. However, in order that the consideration of wage matters should not be postponed indefinitely he proposed to bring about the earliest practicable organization of any machinery which should be provided by the new railroad legislation, or, in the event that such provisions were not included, to use his influence to get the companies and employees to agree on a special tribunal to settle the matter. He also promised to constitute a committee of experts to begin an immediate investigation of the entire problem for the purpose of expediting its solution.

Following the President's decision and in accordance with his expressed desires, the threatened strikes of maintenance of way workers and trainmen were indefinitely postponed. The labor leaders in their reply to the President's decision objected to waiting for the creation of a tribunal by legislation, but tentatively accepted his proposal for the creation of a joint tribunal composed of representatives of the railroads and employees, on the condition that a final decision be handed down within 60 days after the agreement to establish this tribunal.

When the labor leaders definitely learned of the new labor provisions included in the bill by the congressional conferees at the suggestion of Director-General Hines, they redoubled their efforts to defeat its passage. Open threats were made against those voting in favor of its passage. This campaign of coercion caused resentment among senators and representatives, and the final votes, 249 to 150 in the House, and 47 to 17 in the Senate, were indicative of their reaction.

The signing of the bill by President Wilson on February 28 was followed immediately by a letter from the President to the heads of the 15 organizations which had been fighting for action on their wage demands, announcing that their requests would be handled through the machinery created by the new law. In so acting the President automatically disposed of the organizations' counter proposal that a joint special commission be appointed to render a decision in 60 days.

Accepting the inevitable, the labor leaders adopted resolutions expressing their objections to the Transportation Act but stating that "as American citizens we feel that in the interest of railroad labor there is nothing left for us to do at present except to co-operate with each other in the prompt creation of the machinery provided for in this law."

Labor's next political move was likewise a failure. The so-called Anderson amendment to the Esch-Cummins Bill, introduced and backed by the brotherhoods as part of their fight to continue centralized enforcement of discipline as it was during government control, was defeated in Congress.

Development of Organization Unity

During the progress of the congressional hearings and the negotiations between Director-General Hines, President Wilson and representatives of the brotherhoods, the unions further merged their interests. This tendency toward unit action was abetted by the fact that both Director-General Hines and President Wilson negotiated with the 16 brotherhoods as one group and considered their demands as a whole. The result was the development of the "Associated Standard Recognized Railroad Labor Organizations," a term used thereafter in all labor negotiations. An officer of the American Federation of Labor is the authorized spokesman for this alliance which was given teeth by an agreement, made in February by the executives of 15 of the principal organizations of railroad employees, that in case of a controversy which might result in a strike, a vote of all the organizations parties to the agreement would be taken so that, if the vote carried and "extreme action" was decided on, all would strike at once.

The railroads were returned to private operation, then, with higher wage levels, changed working conditions, greater unity between the railway unions, wage demands totaling a billion dollars, strike votes, "postponed" strikes and general unrest.

Preliminary conferences between representatives of the carriers and of the labor organizations aimed at settlement of the wage controversy were begun on March 10. The director-general opened the first meeting and urged settlement of the wage question by this means rather than by reference to the new Railroad Labor Board. After almost a month of negotiation the carriers' representatives declined the employees' requests on the ground that they could not assume the responsibility of adding such a burden to the cost of transportation. This transferred the entire controversy to the Labor Board, only the nominations for which had been made.

The "Outlaw" Yardmen's Strike

The dissatisfaction of the employees because of the long delays reached a crisis at this time and resulted in a series of strikes of yardmen, largely members of the "outlaw" yardmen's associations, which seriously interfered with terminal operation throughout the country. Directed, as this strike was, at the alleged inaction of the brotherhood leaders and at the carriers, it soon found railway officers and executives of the labor brotherhoods fighting side by side to defeat the movement. There was no other course open to either carriers or labor executives. The latter were fighting to uphold contracts they had signed with the railroads and for the life of their organizations. The railroads were fighting to uphold their part of the contracts with the brotherhoods

and because granting the demands of the "outlaws" would have meant not only raising the wage level of all classes of employees, but destruction of the usefulness of the Labor Board before it had begun to function. The only beneficial effect of the strike was to expedite the appointment of the Labor Board. President Wilson submitted his nominations for members of the board on April 14 and they were promptly approved.

Hearings Before the Railroad Labor Board

The hearings which resulted in the Board's award on July 20 were started at Washington on April 20. The first official act of the Board was to deny representatives of the "outlaw" strikers a hearing of their grievances on the ground that they had not complied with the terms of the Transportation Act and that cases brought before the Board in accordance with the procedure outlined in the Act should have precedence.

The presentation of the employees' demands occupied the board's sessions from April 20 until May 8, when the board moved to its permanent home at Chicago and began hearing the carriers' side of the controversy. The hearings continued until June 2, when the board went into executive session to formulate its award.

Meanwhile, the sporadic strikes of yardmen continued with gradually decreasing effectiveness. The strike situation was brought to the attention of the President and again he entered the controversy by suggesting to the board that it make some announcement as to its probable award which would allay the unrest. The board accordingly set a "deadline," July 20, for its decision, and on that date granted railway employees advances in wages totaling approximately $620,000,000 annually and retroactive to May 1.

The board's final decision dealt wholly with wages and specifically deferred for later consideration the questions raised as to rules and working conditions. The executives of the brotherhoods met in Chicago, and only one, the Order of Railway Telegraphers, voted to reject the award. Later the chiefs of the organizations ordered a nation-wide referendum with a strong plea against strike votes. And the brotherhoods gladly accepted the board's decision. With the gradual collapse of the "outlaw" strikes, railway labor troubles seemed to be settled for a time at least.

Other Labor Board Rulings

Several subsequent decisions, whose importance was overshadowed by the magnitude of the July 20 award, were rendered by the Labor Board. The employees of the American Railway Express Company were awarded advances of approximately $30,000,000 per year, retroactive to May 1. Employees of the Bangor & Aroostook were awarded the same rates as were awarded to other railroad employees in the board's decision of July 30. Lighter captains employed on railroad-operated barges in New York harbor were awarded an increase of $25 per month effective on March 1. Hearings were begun on October 18 on the demands of employees of short line railroads for the same rates of pay as Class I railroads. These hearings continued until November 24. A partial decision was rendered on December 11, but it is expected that the final decision of the board will be given early in 1921.

Political Activities of Labor

As stated before, the railway brotherhoods threatened political action against those senators and representatives who voted for the Esch-Cummins Bill. With the aid of the Plumb Plan League and the American Federation of Labor an extensive propaganda was carried on in the national political campaign against them, but without success. The returns from the election show that most of the senators and representatives who voted for the bill and who were candidates for re-election were re-elected, and, while many of those who voted for the bill were defeated, this was more due to the Republican "landslide" than to the work of the labor organizations.

National Boards of Adjustment and National Agreements

The year closed with two vital controversies still "hanging fire," the establishment of boards of adjustment and the perpetuation of the national agreements placed in effect during the period of federal control being still in an unsettled condition.

The Transportation Act provides that national boards of adjustment *may* be established by "agreement between any carrier, group of carriers, or the carriers as a whole, and any employees or subordinate officials of carriers, or organization or group of organizations thereof." The representatives of the employees have stood firmly for the creation of national boards, whereas the carriers have stood as firmly for the creation of boards either for the individual roads or for systems of roads. The brotherhoods' stand is in line with their fight for the passage of the Anderson amendment, *i. e.*, for centralized control over rules and working conditions as far as possible in order to allow unit action.

Many railway executives feel that if national boards of adjustment should be established the principle of the "open shop" in railroad work would be ended and the "closed shop" substituted, with a resulting standardization of working rules, regardless of the varying conditions on the carriers. Others do not entertain the same fear of national boards of adjustment.

During the hearings in the short line railroad case, labor's representatives asked for an executive session of the board at which they could present information regarding existing labor conditions. This request was granted and on November 29 they plied the board with veiled threats based on alleged inability to keep their men in hand unless their demands for the immediate establishment of machinery to handle disputes regarding rules and working conditions were granted. The establishment of such boards is not mandatory under the terms of the Transportation Act nor are there specific provisions authorizing their establishment by the Labor Board. These facts have been recognized by the board; and although it cannot take definite action in the matter, it has offered aid in consummating an agreement between the carriers and employees.

At the present time three bureaus, each composed of three members of the Labor Board, are handling minor wage controversies. It is possible that in the event that the carriers and the brotherhoods are unable to agree upon the establishment of boards of adjustment, these bureaus, or the board as a whole, depending upon the magnitude of the cases, will handle controversies regarding rules and working conditions as it is authorized to do by the Transportation Act. This would throw a large amount of detail work on the members of the board and tend to interfere with their thorough consideration of more important wage matters. Whatever solution of the question is adopted, present conditions clearly indicate that some machinery must be created as soon as possible if the spirit of the Transportation Act is to be carried out.

The question of the perpetuation of the national agreements with several of the larger brotherhoods, consummated during the period of federal control, is another legacy of 1921. It is intimately connected with the question of the establishment of national boards of adjustment, inasmuch as it apparently represents another phase of labor's desire to centralize and nationalize control over rules and working

conditions. The whole controversy is scheduled to come before the board on January 10, 1921.

Representatives of both the carriers and the brotherhoods have been working for some time on their respective presentations in this case. Without doubt the labor leaders will fight vigorously for the continuation of the national agreements, and the carriers' representatives will as vigorously oppose their continuance. Of the controversies likely to arise in 1921, that over the national agreements appears to be the most important.

The Outlook for 1921

In looking into 1921, the railway executives seem to have reason to be optimistic, the labor executives pessimistic. The present period of readjustment, with its decreasing living costs and demand for labor, predicts easier labor conditions, increased efficiency and conservatism.

Since September immigrants have been swarming into the United States at the rate of 900,000 a year, while the consulates abroad report that unless legislation interferes the exodus from Europe to America will be measured only by ship capacity. It has been estimated that 10,000,000 Europeans are planning to migrate to America as soon as possible. The estimate for Italy alone is 8,000,000. It is freely predicted, therefore, that unless some restrictive legislation is passed both in the United States and abroad immigration in 1921 will greatly exceed the previous high record of 1907 when 1,285,349 immigrants entered the United States. These conditions led the House of Representatives recently to pass a bill restricting immigration for 14 months and the measure is now before the Senate.

While there is still an admitted shortage of some classes of railroad labor in certain sections, to a large extent transfers from one department to another and from unskilled classes to skilled classes and the employment of new men to complete forces will take care of this difficulty. It may be said, of course, that the largest number of immigrants will be attracted to the cities and into the industries. This would probably be true if the wages paid in industries were as stable as those paid for railway work. Even now, however, a discrepancy between the wages paid in the industries and by the railroads for similar work can be seen. Such conditions would result in bringing into railway work all of the new labor needed and a shortage of railroad labor would cease to exist, at least temporarily.

What, then, can be expected in 1921? Insofar as the individual worker is concerned, there will be an increase in efficiency through the restoration of morale and discipline. This, in turn, will be attributable to, first, the economic readjustment which inevitably creates unemployment, lower living costs and lower wages, and, second, the surplus of labor due to increased immigration. Furthermore, the railway worker, receiving wages above the going rate, will not readily subscribe to radical, thoughtless action imperiling his position and income.

On the other hand, the indications are that dealings between the railroad labor organizations and the carriers will have to be carried on diplomatically in order to avoid open breaks. Vigorous political and nationalization offensives will probably be continued by the executives of the larger brotherhoods. The outcome of the resulting conflict will depend largely upon the attitude and action of the Railroad Labor Board. At the present time it is not apparent that the board realizes the magnitude of the effect its decisions have had and will have on the whole economic fabric of the nation. It is certain that the public will be awakened to the far-reaching effect of the developments in the railroad labor situation and that, once awakened, will demand firmness in determining the future reward and working conditions of labor.

The State Law Reporting Company, Woolworth Building, New York city, announces that it has taken the contract for reporting the hearings before commissioners and examiners of the Interstate Commerce Commission throughout the United States. The work requires the taking of testimony at about 3,000 meetings a year, and the writing out of approximately 1,000 pages a day, and the contractor is required to maintain a number of branch offices throughout the country, from which reporters are sent out to attend hearings held within a certain radius. Sometimes ten or fifteen hearings are held on the same day. The Interstate Commerce Commission employs 40 to 50 examiners who conduct hearings.

Photo by Ewing Galloway

Aerial View of Union Station, Senate Office Building and Post Office, Washington, D. C.

Waiting Room and Ticket Office of a Union Station Used by Six Railroads

Fate of Railroad Administration Innovations

A Survey of the Present Status of the Important Changes Inaugurated During Federal Control

ALTHOUGH MANY of the innovations introduced by the United States Railroad Administration in its unified operation of the railroads and in the handling of their traffic no longer remain in their original form, they have left their influence upon railroad practices in a manner that will be felt for a long time in the future. Some of these changes had long been advocated by railroad men themselves, while others were made possible only by the unusual conditions ushered in by unified control. But whatever may have been the immediate causes of these innovations, the results have been threefold. Certain of them have been discontinued almost in their entirety because centralized control could not, or did not, take cognizance of local conditions which private operation could not disregard. Others have been abandoned because the restoration of competitive conditions made their continuance impossible. A third class comprise those which have been retained in modified form to meet new conditions, and because they present distinct advantages in improved service.

COMPETITIVE CONDITIONS have necessitated the discontinuance of many of the changes or innovations which were introduced during the period of control by the Railroad Administration.

Some of these, however, have proved of distinct advantage under private management and are being retained in such form as will best suit the new conditions.

Consolidated ticket offices and joint railroad and shippers' committees on rates have been quite generally continued.

It is the purpose of this article to review the more important of these innovations and to indicate their present status. The changes which will be discussed include the establishment of consolidated city ticket offices, the unification of terminals, the drastic curtailment of advertising, the establishment of joint railroad and shippers' committees on rate matters, the pooling of equipment, the elimination of duplicate train service, the joint use of freight and passenger stations, the discontinuance of off-line agencies, and the practice of collecting freight for solid train movements, together with the allied "sailing day" plan.

Consolidated Ticket Offices Remain

One of the innovations which was brought most prominently before the public was the consolidated ticket office. Although the system has been abandoned at many points and has been modified in part where retained, many of the original offices are still in existence with but few roads withdrawing. It was recognized by the railroads at most places when they returned to competitive conditions that the consolidated ticket offices were economical and performed a service to the general public which the separate offices could not render. While many of the roads have considered that the system was detrimental to them individually, they have believed that the handicaps and disadvantages of the loss of identity, and the creation of certain routes of travel at the expense of the smaller roads could be offset by a unit system of identification within the office and by thorough and active solicitation of traffic outside. The system of allotting a designated space within the consolidated office to a road which provided its own employees at the counter, is the plan in effect where joint, if not consolidated, offices are maintained.

At Chicago three roads have withdrawn from the consolidated ticket office to open separate offices, while 19 roads remain at the original location. The consolidated offices at New York, San Francisco and a number of other points

nave also been continued. At St. Louis, Mo.; Dallas, Tex., and Kansas City, Mo., the roads have returned to the unit plan of segregation, while at Minneapolis, Minn., since the consolidated office has been broken up, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Great Northern operate a joint office.

Unification of Terminals Retained in Part

Among the innovations of the Railroad Administration which have been retained in part is the plan for the unified operation of terminals. It has been generally agreed that the roads derived numerous benefits from the joint operation of terminals. Many handicaps were also present so that the return to private operation has led to modification, and in many instances abandonment of the plan. Even excluding the unusual conditions resulting from the war, it has become evident that the terminal facilities of the roads have not kept pace with the growing needs of the traffic. For this reason considerable increases in economy of operation and in efficiency of service have been effected through continued consolidation of certain terminal facilities. For example, the Stock Yards District Agency at Chicago, which was formed in August, 1918, through the consolidation of 21 individual railroad agencies, is still in successful operation and is likely to remain permanently. Another co-operative movement, the joint agency established at the Chicago Board of Trade Building in September, 1917, for the convenience of shippers in the collection of freight charges on in-bound grain, and participated in by all roads having Chicago terminals, also bids fair to become permanent.

At the same time, a number of factors incident to the return to the competitive conditions of private management tend to make impracticable the joint operation of terminals. Generally, roads which have built terminal facilities at great expense do not find it expedient to share them with competing roads which have acquired no such facilities. Another consideration has been the difficulty of finding any one road in a terminal center with facilities adequate to take care of the combined business of the other carriers. A third difficulty has been the objections on the part of shippers and consignees to the inconvenience of having to go considerable distances to collect and send freight when their business houses have been located in close proximity to the terminal of the road which they patronized. As a fourth reason, the carriers find it necessary under competitive conditions to adopt measures which will permit them to handle the maximum amount of individual business.

The plan has thus been continued up to the present only in a modified and limited form, but it will exist permanently as a possibility in the provision of the Transportation Act that empowers the Interstate Commerce Commission in transportation crises to "require such joint or common use of terminals, including main-line track or tracks for a reasonable distance outside of such terminals as in its opinion will best meet the emergency and serve the public interest and upon such terms between the carriers as they agree upon, or, in the event of their disagreement, as the Commission may after subsequent hearings find to be just and reasonable."

Advertising Resumed in Different Form

When the government took over the railroads as a war-time measure all activities tending to the development of traffic, with the exception of the agricultural development work were stopped. Later, the signing of the armistice and the attendant recession of business forced the Railroad Administration to revive advertising to stimulate travel. With the return of the roads to private control, competitive conditions have necessitated more elaborate campaigns, but the roads are now concentrating more on campaigns of creative and constructive advertising designed to promote tourist travel, to populate and cultivate new areas, to present service changes and to educate the public regarding railroad conditions. This last—advertising to secure and hold the good will of the public—to work hand and hand with patrons and inform them—may be said to be the underlying principle of present practices.

In this endeavor to bring to their patrons the facts surrounding the operation of the railroads the plan developed by the Illinois Central serves as a striking example. This road is sending a personal representative to interview farmers resident along its lines to ascertain their views and needs. The information thus secured is compiled and then circulated among all the employees throughout the territory served by the road, thus bringing the employees as well as the patrons of the road to understand the problems that both encounter.

Before federal control most of the roads passing through undeveloped parts of the country maintained special departments to promote the settling of these areas as well as to co-operate with the industries they served. These are now being re-established. Thus the Northern Pacific recently created a department of immigration and industry to take over this work. Most of the railroads serving developed areas maintain supervisors of agriculture or departments to co-operate with the growers, shippers and dealers throughout their territory. The supervisor of agriculture of the Union Pacific and the Oregon Short Line recently compiled a list of shippers of agricultural products in their territory, together with a list of the dealers in these products located in the large distributing centers. These lists were mailed to shippers and dealers in an effort to facilitate the sale and marketing of agricultural products. These methods and plans are not new. The interesting and important fact is that they are now receiving more attention.

Joint Railroad and Shippers' Committees on Rates Continued

One of the innovations introduced by the Railroad Administration was the creation of joint committees of shippers and railroads to pass on rate matters, which procedure was inaugurated early in July, 1918. This step was the outgrowth of a desire to arrive at decisions on rates by conference and agreement more promptly than was possible by separate action before the Interstate Commerce Commission with its resulting controversies. From this beginning the advantages of joint action have become increasingly evident to both carriers and shippers. Unlike numerous other innovations which have gone by the board wholly or in part with the restoration of competitive conditions, the joint conference plan is in successful operation at present and seems likely to have a permanent place in transportation practice.

That the plan was appreciated by the shippers is evidenced by the fact that on March 10, 1920, a committee representing the Southern Traffic League proposed a plan of continued co-operation with the railroads in the adjustment of rates to produce the 5½ per cent return fixed by the Transportation Act. The League made the proposal that the carriers and shippers work jointly on a new system of tariffs designed to produce the required revenue and opposed the former practice where the carriers customarily presented tariffs to the Interstate Commerce Commission for approval which the shippers had not seen, and which they would consequently oppose in their entirety because of objections to certain features.

The shippers, however, have not been alone in advocating the plan for co-operation. The roads have appreciated their aid in securing needed rate increases, as is evidenced by the fact that representatives of the executive departments of 17 trunk line railroads met with the executive committee

of the National Industrial Traffic League on November 19, 1920, at the annual meeting of the organization in New York to discuss and analyze complaints of the shippers, and to arrange for close co-operation between shippers and carriers.

At this conference the carriers assured the shippers that (1) there is no preconceived or concerted plan of the carriers to change rates, rules, regulations or practices for the sole purpose of obtaining increased revenue in addition to that which has been found necessary by the Interstate Commerce Commission; (2) rate committees and tariff bureaus will be instructed to devote their first attention to readjustments contemplated by the carriers' recent application to the Interstate Commerce Commission, to the prompt publication in regular tariff and supplement form of the authorized rates, and to prompt decisions on the applications of the shippers for readjustment of old rates and establishment of new rates; (3) the responsible traffic officers of the railroads will undertake to review and consider carefully other changes of rates, rules, regulations and practices, initiated or recommended by the rate committees with a view to forestalling any such changes as may be inopportune, and (4) the roads agree to give the same attention to classification matters.

On its side the League (1) insists upon transacting its business with the traffic executives of the railroads who are responsible for the maintenance of proper relations between the carriers and the public; (2) desires the traffic executives to act as the point of contact with the American Railway Association in matters of demurrage and other traffic affairs which are national in scope; and (3) desires the traffic executives to act as the point of contact with the Railway Accounting Officers' Association in all accounting matters in which the shippers are interested.

The result of the meeting was the establishment of joint committees to co-operate in handling matters of mutual interest to shippers and carriers which may arise in the future. With such movement as this gaining headway, it would seem that the plan for joint conferences between shippers and the railroads is to have a lasting effect.

Pooling of Cars Abandoned

The pooling of equipment, a feature of railroad operation introduced during federal control, was partially abandoned three months before the roads were returned to their owners. Realizing that the pooling of equipment made it impossible to secure its adequate maintenance the director general issued orders to the roads to return the cars to their home lines as far as possible before the termination of federal control. This order was successful in effecting an increase in the proportion of cars on home roads from 25.3 per cent on December 1, 1919, to 28.3 per cent on February 1, 1920, although this figure fell to 21.9 per cent before the roads were returned to private management on March 1, in spite of the efforts of the director general and the regional directors. Since that date, however, there has been a steady increase in the number of cars returned to their home lines, until an average of 32.5 per cent of the cars were on home lines on November 15, 1920, as compared with a pre-war normal proportion of about 50 per cent.

Thus it is evident that the pooling of cars as a general practice and in the form in which it existed during the period of federal control, has been abandoned, although the Transportation Act authorizes the Interstate Commerce Commission to order the pooling of equipment whenever "shortage of equipment, congestion of traffic or other emergency requiring immediate action exists in any section of the country."

Duplicate Passenger Service Restored

Prior to federal control competitive passenger train service had been intensively developed between many points. These efforts to gain competitive business found no place under government operation where the roads became units in a vast monopoly. Not only that, but the exigencies of war made conservation and economy of operation of primary importance, while service to the public assumed a secondary position for the time. As a result of these conditions the 15 trains which had been running each way between Chicago and St. Louis daily were reduced to 9, and similar reductions were made elsewhere.

The return of the roads to their owners reversed this situation. The movement toward the return to a competitive basis began when the Pennsylvania, before government control was terminated, restored its Broadway Limited between New York and Chicago. Since that time other roads have gradually resumed operation of competitive trains until at the present time service between such highly competitive points as Chicago and St. Louis, Omaha, Minneapolis and St. Paul, between New York and Philadelphia and between other points is practically on the pre-war basis. A number of roads in all sections of the country are also shortening the running time on many of their competing trains, a movement which gives further indication of the return to the old conditions.

Joint Freight and Passenger Stations Abandoned Largely

Joint freight and passenger stations have been in existence almost as long as the railroads. Federal control, however, brought about a marked increase in their number because of the elimination of competition between carriers. At many of the smaller terminals where competing roads had maintained separate freight and passenger stations consolidations were effected for the purpose of reducing expenses. In some cases this was successful; in others it resulted in added expense because of terminal congestion. With the return of the roads to private control and competitive operation most of the carriers have found it advisable to restore and operate their separate terminals, although some have found it best to continue as a party to the joint arrangements. Among the latter the continued use of the Pennsylvania terminal at New York City by the Baltimore & Ohio serves as a striking example.

Off-Line Agencies Reopened

Competition has also necessitated the restoration of the off-line agencies which were closed early in federal control. Even during government control the re-establishment of these offices had been forcibly brought to the attention of the Railroad Administration, for their withdrawal had caused a storm of protest from the shipping public, which was unable to secure the former service from employees uninformed regarding all of the railroads. The administration sought to remedy this complaint by the establishment of public service freight bureaus, but these were never well developed.

This necessity of service to the shippers, though important in obtaining their good will, was, however, but a means in the all-important solicitation of business when the roads were returned to a competitive basis. The off-line agency is a business-getter, established and maintained to that end. Therefore, with the return of the roads to private control they have practically all been re-established.

In re-opening these agencies the railroads have, nevertheless, modified their pre-war practices to the extent that many of them have replaced expensive street level offices with less showy quarters upstairs where new business can be secured as readily by active solicitation and competent service.

Solid Train Movements and the "Sailing Day" Plan

The plan for solid train movements and designated shipping days represents that class of innovations the economy of which had long been recognized by railroad men. In fact,

solid train movements were already employed as far as possible on a number of roads prior to federal control. The possibilities of the plan were found to be greatly extended with the non-competitive conditions obtained under government control where traffic formerly divided between several roads could be concentrated on one line, as was done with flour from Minneapolis, lumber from the northwest and meat from the packing centers. But the plan for solid freight train movements and for setting certain shipping days for specific places was abandoned to a large extent upon the return of the roads to the competitive conditions of private control, for no carrier is willing to turn its share of any business over to a competing road in order that a rival carrier can run a solid train. It is only in cases where the carrier secures enough business itself to make up a solid train that the plan is continued. The demands of the shippers for more individual attention were important factors in bringing this about. "Sailing days" for merchandise cars, for example, have been wholly done away with, although in the case of live stock shipped to Chicago the shipping day plan has been retained.

Among other innovations was the development of the embargo and permit system. Facing a traffic congestion which threatened to paralyze the transportation system of the country and acting under its broad powers, the Railroad Administration early developed a plan for permits and embargoes. These measures have been perpetuated as means for dealing with similar emergencies by provisions in the Transportation Act which specify that the Interstate Commerce Commission is "to give directions for preference or priority in transportation, embargoes or movements of traffic under permits, at such time and for such periods as it may determine and to modify, change, suspend, or annul them."

One of the measures of the Railroad Administration which aroused the most active hostility was the plan for consolidated purchases. Although it did not extend beyond cars, locomotives, rails and ties, it was the cause of bitter controversy throughout the period of government control. Following the return of the roads to private management the centralized control of purchases disappeared. Interest in the plan has been revived recently, however, by a statement from Senator Cummings advocating consolidated purchases by the railroads.

It is evident from the above survey that a number of the innovations inaugurated by the Railroad Administration have been found equally sound under the conditions of private operation. It is equally evident that many of the changes heralded as notable advances in railroad operation are not applicable under competitive conditions, and that railroad practices as a whole will not differ widely in the future from pre-war methods.

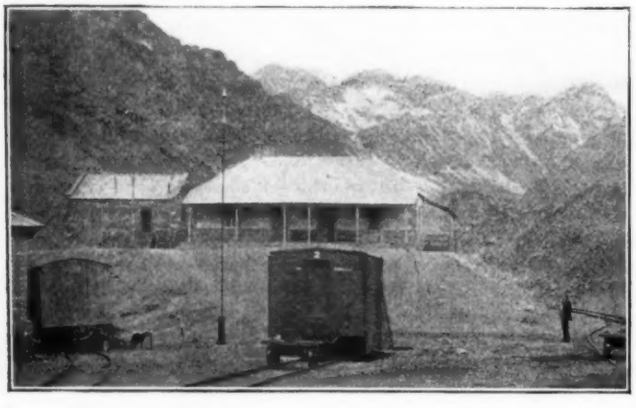


Photo by Keystone View Co.

Railway Station at Juncal, Chile

Manufacturers Call Meeting to Fight National Adjustment Boards

THE DEMAND of organized railroad labor that National Boards of Adjustment be formed to handle all controversies over rules and working conditions, instead of settling such controversies by conference between representatives of the company and its employees as formerly, will be protested at a convention of manufacturers, merchants, railway executives and shippers to be held at the Congress Hotel, Chicago, on January 12, two days after this question is scheduled to come before the Railroad Labor Board. Approximately 500 delegates, representing all sections of the country, are expected to attend the meeting. Acquiescence in the railway brotherhood's plan would mean the opening wedge for collective bargaining and the "closed shop" in all branches of American industry, according to the convention call issued by the National Conference of State Manufacturers' Associations, through its president, William Butterworth, who is also a director of the Illinois Manufacturers' Association and vice-president of the Chamber of Commerce of the United States of America.

In explaining the primary purpose of the convention, the call says in part:

"The Transportation Act of 1920 created the Railroad Labor Board which has jurisdiction over railway employes' wages when controversies are appealed to it. The act also provides that Boards of Adjustment be established by agreement between any carrier, group of carriers, or the carriers, as a whole, and any employees or organization, or group of organizations, which, if established, will have jurisdiction over all working conditions and grievances other than wages. These Boards of Adjustment, however, can only be created by consent of employers and employees.

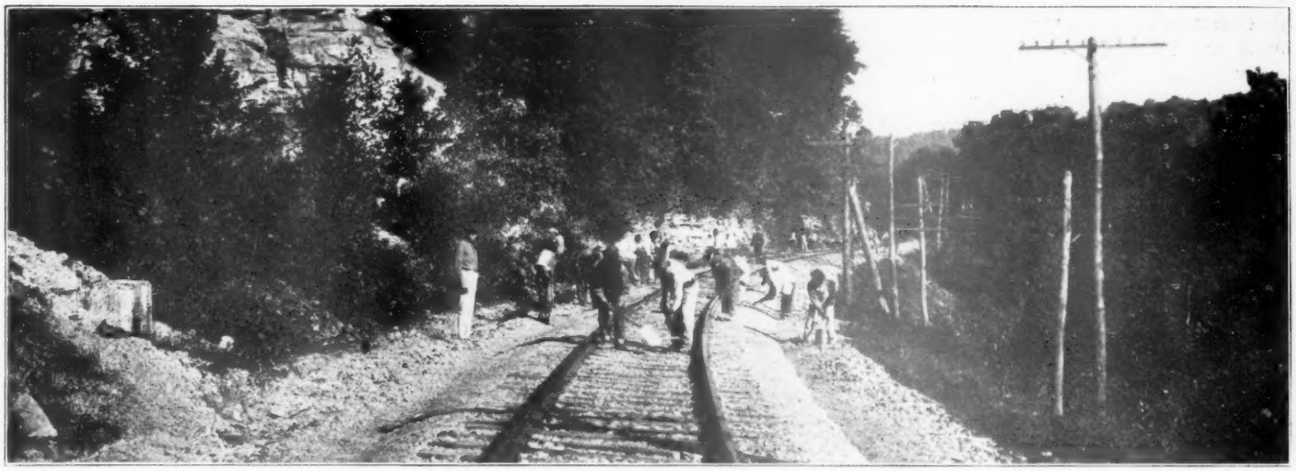
"The railway brotherhoods are insisting upon the creation of National Adjustment Boards. The railway executives are opposing it because, if created, it means the nationalization of railways under the domination of the labor unions and the destruction of discipline, efficiency and loyalty, which are necessary to the efficient and economical operation of the common carriers for the benefit of the people. If the railroads are thus shackled, the resulting conditions must necessarily be reflected in the organization of every manufacturer. It means the 'closed shop' and union domination over all industries alike. This, today, is perhaps the most vital issue facing the manufacturing and producing interests in the United States, and should have immediate attention.

"Therefore, all industrial associations, the purpose of which is the general good of the manufacturing interests, and all corporations, firms and individuals having to do with the production of manufactured articles, and all employers' associations and employers are requested to send delegates to this convention to formulate a clear and fearless expression of opinion, appoint proper committees to carry out the conclusions, to take such steps as will bring to the attention of the country the serious situation that will follow should the railroad brotherhoods succeed in carrying out their purpose, and to transact such other business as may come before the convention.

"Various organizations already have taken cognizance of this matter and have passed resolutions against it. Among these were the Chamber of Commerce of the United States of America, the National Association of Manufacturers, the National Industrial Council, the National Industrial Traffic League, and various individual chambers of commerce, trade and other organizations. The convention of the National Conference of State Manufacturers' Associations, however, will be the first country-wide attempt to express the opinions of the manufacturers of America whose interests will be vitally affected if the railway brotherhoods are successful."

Discussions of the open shop, its effect on employees, companies, production, cost of production and union labor and the immigration problem are also scheduled.

THE DOMESTIC PRODUCTION OF COPPER IN 1920 is estimated by H. A. C. Jensen, of the United States Geological Survey, Department of the Interior, to be about 1,235,000,000 lb., compared with 1,286,000,000 lb. for 1919.



A Year of Progress in Maintenance of Way

Much Still Remains to Be Done Before the Properties Will Have Been Restored to Normal Condition

THE FIRST MAINTENANCE of way season following the return of the railroads to private management was characterized by a general effort to restore the deficiencies which had accrued during the period of government control. Owing to the fact that a large part of the maintenance of way season fell within the limits of the guarantee period established by the Transportation Act, the managements were restricted in a measure by the absence of specific information on the exact interpretation which would be placed by the Railroad Administration on the provision for maintenance of way expenditures during this period. In general they pursued the course of liberal expenditures on much the same scale as would have been the case had the properties been established on a thoroughly independent basis. Whether or not they are to be penalized in their efforts to take up the deferred maintenance during the six-months' guarantee period is still an open question.

Following the return of the roads to a more independent status after September 1, most of them continued the policy of liberal expenditures, although inability to collect compensation due them from the government and reduced earnings caused some of the lines to undertake retrenchment considerably in advance of the normal reduction to the winter basis.

A large part of the maintenance of way season was coincident with a period of remarkable business expansion, coal shortage and labor disturbances in the operating departments of the railroads. These conditions imposed three obstacles to efficient maintenance: an inadequate supply of material, a labor shortage and a congestion of traffic. These influences served to interfere with a realization of the full results in the programs for taking up the deferred maintenance but the degree to which these factors affected the results varied widely with the location and physical characteristics of the roads.

One of the foremost deficiencies was an inadequate supply of rails. At the beginning of 1920, the United States Railroad Administration had in stock only 375,000 tons of rail, while 200,000 tons in addition were on order undelivered by the mills. To this available supply must be added 73,500 tons obtained on an emergency order last February, making a total of about 650,000 tons, which represents the entire tonnage of rails made available by the United States Railroad Administration for 1920 renewals. This, however, does not include all of the tonnage provided because, thanks to the corporate organizations of the roads, orders were placed with the mills for delivery following the return to private management. No accurate information is available in regard to the amount of rails delivered during the past year, but it was unquestionably too small to effect any reduction in the accrual of deferred rail renewals.

Taking the country as a whole, the situation as to ties presented a more favorable aspect. Owing to the failure to establish a satisfactory means of anticipating the needs of the railroads under private management, tie purchases were largely deferred until after March 1. Nevertheless, many of the roads were able to obtain practically their full requirements. Other roads were not so fortunate and have entered the new year with accrued tie requirements considerably in excess of normal. One tendency of the past year in tie purchases which is unquestionably a direct result of the two years of centralized tie purchases was that many roads which had formerly procured their ties locally or within

DURING THE ACTIVE maintenance of way season of 1920 the railroads made a concerted effort to restore their properties to a normal condition. Inadequate supplies of materials, local shortages of labor and congestion of traffic, imposed serious obstacles in the way of this undertaking.

Efforts of the management to raise the personnel standard in the maintenance of way forces were aided in the closing months of the year by the sharp change in condition of the labor market.

limited distances from their own lines entered markets in remote territories. Another tendency observed was the impetus given to timber preservation during the past year. A number of new treating plant projects were undertaken largely because certain railroads formerly given to the use of untreated ties have become committed definitely to the use of preservatives.

The Labor Situation

Labor conditions during the past year were unusually spotty. In spite of the hue and cry that went up early in the year regarding an insufficiency of farm labor to gather the crops, the railroads in strictly rural territory had far less difficulty in securing an adequate supply of men. In some of the industrial centers, on the other hand, labor was exceedingly scarce and inefficient. In fact, it was the opinion of some maintenance officers that conditions were worse than at any time previous. One interesting phenomenon largely influenced by the scarcity of labor was the introduction of contract maintenance work on a few roads, particularly in the form of cost plus agreements. Another phase of the situation is illustrated by the apparent restoration in full of all former practices with respect to the employment of labor through fee labor agencies.

No review of the labor problems of 1920 is complete without reference to the organizations of maintenance of way employees and the relations between the organizations and the managements. In the maintenance of way field, the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers came into the limelight at the beginning of the year through the publicity given to its venture into the co-operative manufacture and distribution of wearing apparel, several glove and underwear factories being purchased outright by the union. Of far greater significance to the country as a whole was the issuance of a national strike order by the grand president, A. E. Barker, which was to have become effective on February 17. This led to a widely quoted exchange of letters and telegrams between President Barker and Director General Hines and President Wilson, with the result that the strike was called off. In April the organization suffered some internal troubles as a result of which President Barker and George Seal, grand secretary, resigned and a group of the members seceded to form a separate organization known as the American Brotherhood of Maintenance of Way Employees.

In general the policy pursued by the maintenance of way officers toward the men during the past year has been one for the restoration of the old-time loyalty to the company. There has also been an increased recognition of the fact that a corps of foremen of a caliber necessary for the efficient prosecution of the work can only be maintained if good timber for the development of such gang leaders is to be found among the rank and file. The higher wages paid following the award of the Labor Board on July 20 did much to improve the situation in this regard, especially in rural districts where many of the roads are now able to secure a notably higher grade of men than was possible for some time in the past. The eight-hour day, which has been a stumbling block in certain phases of maintenance work, has been maintained rigidly in most quarters, although during periods of the severest labor shortage some roads were forced to employ men on the 10-hour basis, partially to obtain the required output and partially as a means of holding a force which was not satisfied with the compensation obtainable for eight hours' work. With the decline of business operations during the late fall months, the aspect of the labor situation was entirely changed and many roads are now endeavoring to improve the character of the maintenance forces.

Heavy Traffic and Congestion Interferes

Traffic conditions interfered with the conduct of maintenance in three ways, through the shortage of cars, restrictions on the use of tracks, and reduced work train service. With traffic heavier than at any time in the history of the roads, the pressure to place in revenue service all equipment that was in any way suitable to that end, and to eliminate all possible interference with the use of tracks was unusually severe. This not only reduced the progress of the work but served to increase the cost. In those centers where the outlaw switchmen's strike took on the broadest scope and was of greatest duration, work train service was restricted for the simple reason that there were not enough train crews to man these trains.

In conclusion, the maintenance of way forces accomplished all that could be expected of them in view of the obstacles in their way and there has been a noticeable improvement in the condition of railway tracks. In the case of railway bridge and building work, there has been more of a tendency to carry the work over into the future. As a consequence, it may be said that insofar as renewal of rails, extensive ballasting, and renewals of structure are concerned, the railroads still have the great bulk of the work before them and with both materials and labor available on a basis that has not obtained in five years, the opportunity for real progress is at hand.

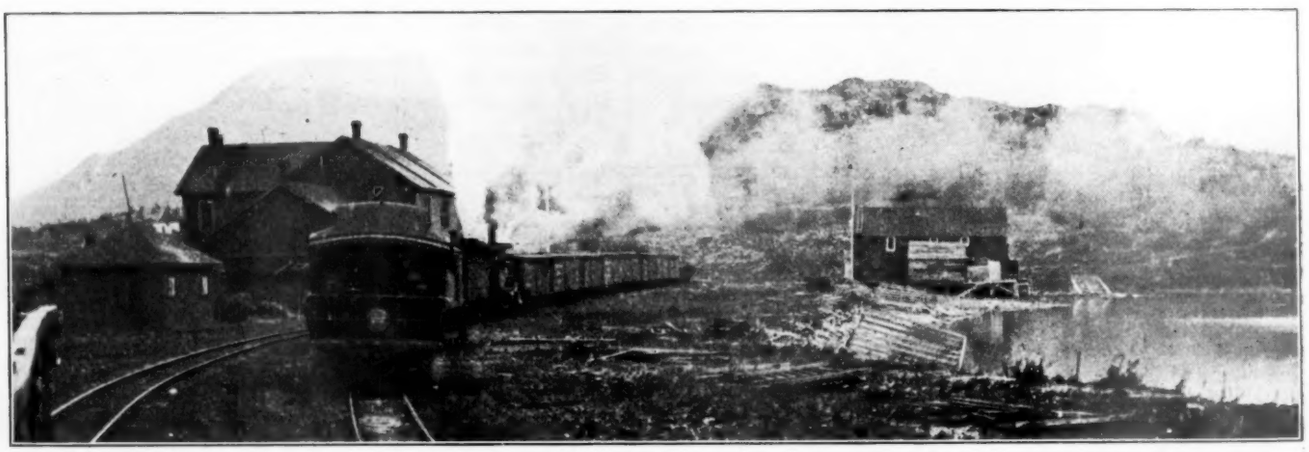


Photo by Ewing Galloway

Klondike Train at Bennett, Alaska

Illinois Central Car Yards at Chicago. Photo by Ewing Galloway, N. Y.

Car and Locomotive Prices Reach Peak in 1920

Equipment Ordered During Year Cost Two and One-Half to Three Times 1910-1914 Average

THOSE RAILROADS that purchased locomotives in 1920 paid prices for them averaging about two and one-half times the pre-war prices. The prices of freight cars were even higher in proportion than this, all-steel cars being priced at three times the pre-war figures and cars of composite construction at more than three times the pre-war prices. The increase in passenger car prices was not as pronounced, the 1920 values having been slightly over twice the 1910 to 1914 average.

Detailed figures are given in this article showing this price relationship as between 1920 and the pre-war period. There is also given a table showing the prices paid for the U. S. R. A. standard equipment allocated to the railroads and, what is more important, data showing the prices which have been paid by a number of railroads for equipment which they have ordered in 1920. For purposes of showing more particularly the price trend during the year, there are also shown details of the prices of the basic iron and steel commodities which enter into the manufacture of all types of railway motive power and rolling stock.

PRICES PAID for locomotives in 1920 were two and one-half times the average of prices for the years 1910-1914; for all-steel freight cars, three times; for freight cars of composite construction more than three times and for passenger coaches more than twice.

Present downward tendency of basic iron and steel prices is reflected in reductions in equipment prices of about ten per cent from year's peak.

This information is made available through new conditions.

Table I is a chart compiled for valuation purposes by the President's Conference Committee on Federal Valuation. The chart represents careful studies made by the engineers of that organization in co-operation with the equipment builders. The studies cover 10½ years, and to derive the figures shown, data were assembled covering the prices of 10,500 locomotives, nearly 275,000 freight cars and some 1,600 passenger coaches. The prices in all instances were "as sold" and cover the date of sale, not the date of delivery. The base price of 100 in the chart is taken for the period 1910 to 1914, both inclusive. The comparative percentages are worked out for the years 1910 to 1919 and for the first six months of 1920; the last figures are the ones of chief interest in this connection. The prices for the first six months of 1920 are given in the following percentages of the 1910-1914 base price:

Locomotives	251
Freight cars:	
All-steel	300
Composite	313
Passenger coaches	218

In using the figures for the first six months it must be borne in mind that approximately two-thirds of all the orders placed during the year were placed before July 1. The price trend for the year was slightly upward from January to May or June. It then ran on a level to about the latter part of October, and since that time it has fallen to slightly below the January figure. In view of these facts, and that but few orders have been placed in the last three months, it is apparent that the percentages given for the first six months are quite representative of the greater part of the orders placed for the entire year.

Table II giving the prices paid, or to be paid when finally ascertained, for the allocated U. S. R. A. standard equipment, needs but little comment. These prices are those set in connection with the equipment trust agreement made last spring to finance these cars and locomotives. They are, of course, for the year 1918, that being the year in which the orders were placed. It is interesting to note in this connection that Table I shows no freight car per-

centage for 1919, no orders having been reported for that year in the valuation studies.

Table III vies with Table I as being one of the most

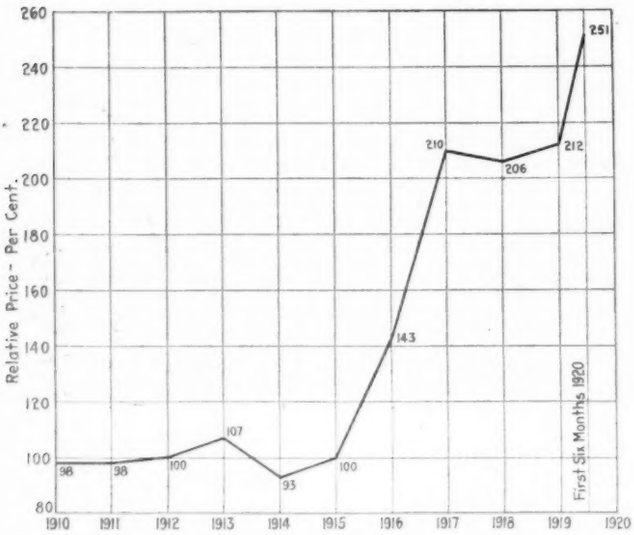


Fig. 1. Relative Prices of Locomotives 1910 to First Six Months of 1920 Shown in Terms of Average Prices 1910-14 as 100

interesting compilations of its kind which has ever appeared in the columns of the *Railway Age*. It gives in detail the prices paid per unit for a large proportion of the

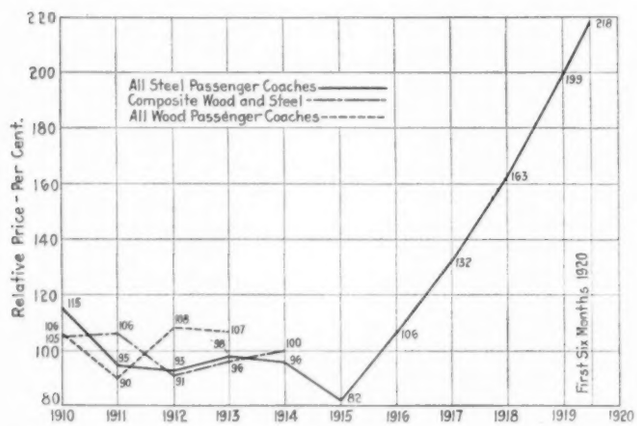

All Steel Passenger Coaches
Composite Wood and Steel
All Wood Passenger Coaches
Relative Price - Per Cent.
First Six Months 1920

Fig. 3. Relative Prices of Passenger Coaches, 1910 to First Six Months of 1920 Shown in Terms of Average Prices 1910-1914 as 100

cars and locomotives, orders for which were placed during 1920. The information is made available this year for the first time through the publicity, if such it may be called, given applications of the carriers for loans from the revolving fund or in the case of the approval by the Interstate Commerce Commission of issues of equipment trust certificates. The carriers show in their applications the details of the expenditures which the loan or equipment trust issue covers. The commission has adopted a policy of making this information public when its action, favor-

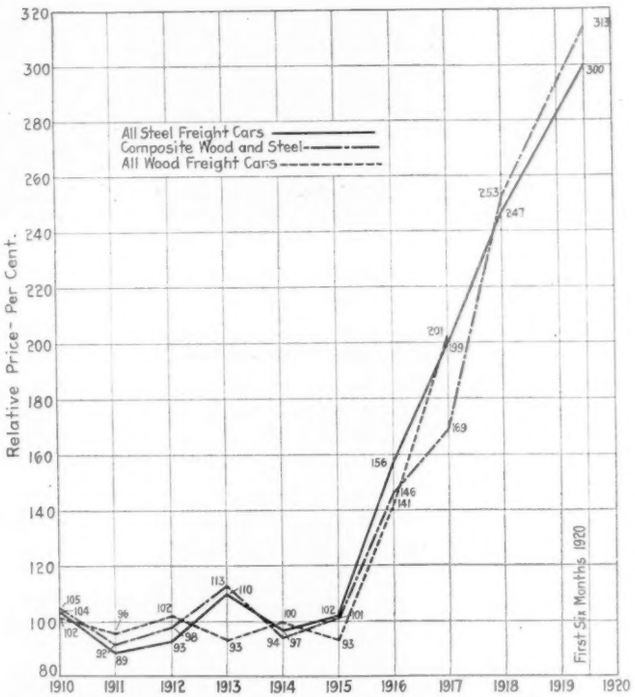


Fig. 2. Relative Prices of Freight Train Cars, 1910 to First Six Months of 1920 Shown in Terms of Average Prices 1910-1914 as 100

able or otherwise, is announced; the information, however, is not available before that action is announced.

The details given vary in nearly every case, depending upon conditions. In compiling the data given herewith, the information made available by the commission has been supplemented by details obtained from other sources. Thus in the usual instance the road shows the number of locomotives (or cars) involved, the type and the total cost of the equipment of that particular type. For instance, a road may indicate that it desires to finance the purchase of

TABLE I—COMPARISON OF PRICES OF EQUIPMENT, BASED ON DATA RECEIVED FROM SIX PRINCIPAL EQUIPMENT COMPANIES IN THE UNITED STATES, USING THE WEIGHTED AVERAGE PRICE OF 1910 TO 1914 AS 100 PER CENT OR "BASE"

	Locomotives	Freight cars			Passenger coaches		
Price as sold 1910-14, incl. Year or period	147.7096 dollars per ton Per cent	All steel 2.57 cents per pound Per cent	Composite wood and steel 2.51 cents per pound Per cent	All wood 2.26 cents per pound Per cent	All steel 11.24 cents per pound Per cent	Composite wood and steel 9.91 cents per pound Per cent	All wood 9.22 cents per pound Per cent
1910-1914, incl. Base	100	100	100	100	100	100	100
1910	98	104	105	102	115	105	106
1911	98	89	92	96	95	106	90
1912	100	93	98	102	93	91	108
1913	107	110	113	93	98	96	107
1914	93	97	94	100	96	100	...
1915	100	102	101	93	82	...	...
1916	143	156	146	141	106	...	...
1917	210	199	169	201	132	...	...
1918	206	247	253	...	163*	...	...
1919	212	...	...	...	199*	...	...
1920 (first six months)	251	300	313	...	218	...	...

*Car companies report no steel passenger coaches contracted for in 1918 and 1919. Per cents for 1918 and 1919 estimated by car companies.

10 Mikado locomotives at a total cost of $800,000, and 10 Pacific locomotives at a total cost of $680,000. From this it is evident that the Mikado locomotives will cost $80,000 each and the Pacifics $68,000 each. If the order has already been placed, we have supplemented this information from our own records with the name of the builder and the total weight in working order. We have also indicated the issues of the *Railway Age* in which the order was reported and the action by the commission noted. The notation "L.F." indicates that this action referred to an application from the loan fund, while "E.T." indicates that reference is made to an issue of equipment trust notes.

The data in the case of freight cars is similarly compiled, except that instead of total weight the details given relate to the capacity and class of construction. In the case of passenger cars the class of construction is given.

The feature concerning prices that is probably most important at the present moment is the trend of prices. It has been difficult to secure definite details as to the prices which have been paid for equipment ordered in the last

TABLE II—PRICES OF U. S. R. A. STANDARD AND OTHER ALLOCATED EQUIPMENT

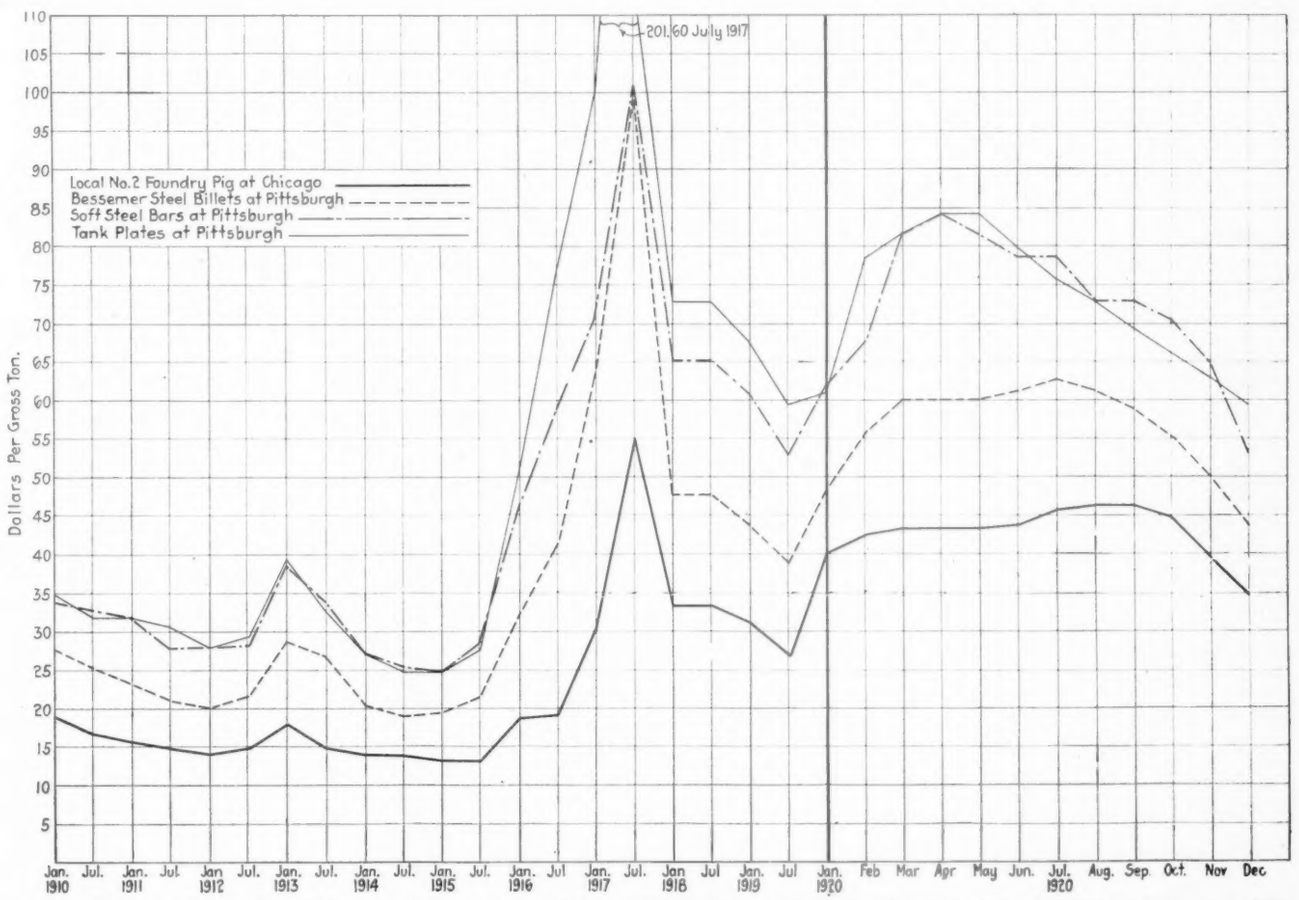
Type	Capacity	Construction	Maximum price	Minimum price
Sgle. sh. box	100,000	St. frame	$3,072.45	$2,815
Dble. sh. box	80,000	St. unf.	2,932.40	2,725
Hopper	110,000	Steel	2,829.32	2,505
Gondola	100,000	Comp.	2,745.01	2,645
L. S. gondola	140,000	Steel	3,212.85	3,100
P. R. R. hopper	140,000	Steel	3,488 flat price	

LOCOMOTIVES

Type	Weight, lb.	Maximum price	Minimum price
Lt. Mikado	290,800	$53,556	$49,400
Hvy. Mikado	320,000	58,529	51,850
Lt. Mountain	320,000	56,995	55,000
Hvy. Mountain	352,000	61,782	55,700
Lt. Pacific	270,000	51,200	49,575
Hvy. Pacific	300,000	54,025	52,300
Lt Santa Fe	352,000	62,003	55,975
Hvy. Santa Fe	390,000	67,317	60,450
Lt. Switch (0-6-0)	165,000	36,049	31,675
Hvy. Switch (0-8-0)	214,000	43,912	37,750
Lt. Mallet (2-6-6-2)	440,000	78,322	71,650
Hvy. Mallet (2-8-8-2)	540,000	91,958	81,575
30 P. & R. Consol	.....	59,029	51,678
26 B. & O. Mallet	.....	87,830	83,400
11 C. of N. J. Mikado	.....	60,529	53,500
3 K. C. S. Pacific	.....	51,000 flat price	
7 T. & P. Pacific	.....	52,955 flat price	
16 T. & P. Santa Fe	.....	59,914 flat price	
2 T. & P. Santa Fe	.....	59,089 flat price	
5 Ft. W. & D. C. Pacific	.....	50,298 flat price	

TABLE IV—IRON AND STEEL PRICES

		Local No. 2 Foundry pig at Chicago, per gross ton	Bessemer steel billets at Pittsburgh, per gross ton	Soft steel bars at Pittsburgh, cents per lb.	Tank plates at Pittsburgh, cents per lb.
1910,	January	19.00	27.50	1.50	1.55
	July	16.56	25.00	1.45	1.41
1911,	January	15.50	23.00	1.40	1.40
	July	14.87	21.00	1.23	1.35
1912,	January	14.00	20.00	1.15	1.15
	July	14.70	21.50	1.25	1.30
1913,	January	17.90	28.50	1.70	1.75
	July	14.70	26.60	1.50	1.45
1914,	January	13.75	20.13	1.20	1.20
	July	13.75	19.00	1.12	1.10
1915,	January	13.00	19.25	1.10	1.10
	July	13.00	21.38	1.25	1.22
1916,	January	18.50	32.00	2.03	2.25
	July	19.00	41.00	2.63	3.44
1917,	January	30.00	63.00	3.15	4.45
	July	55.00	100.00	4.50	9.00
1918,	January	33.00	47.50	2.90	3.25
	July	33.00	47.50	2.90	3.25
1919,	January	31.00	43.50	2.70	3.00
	July	26.75	38.50	2.35	2.65
1920,	January	40.00	48.00	2.75	2.72
	February	42.25	55.25	3.00	3.50
	March	43.00	60.00	3.63	3.63
	April	43.00	60.00	3.75	3.75
	May	43.00	60.00	3.63	3.75
	June	43.40	61.00	3.50	3.55
	July	45.25	62.50	3.50	3.38
	August	46.00	61.00	3.25	3.25
	September	46.00	58.74	3.25	3.25
	October	44.50	55.00	3.13	3.09
	November	39.40	49.70	2.87	2.81
	December	34.50	43.50	2.35	2.65



The Prices of Four Basic Iron and Steel Commodities Which Enter Into the Manufacture of Cars and Locomotives

TABLE III—EQUIPMENT ORDERED IN 1920

Locomotives

Road	No.	Type	Weight	Builder	Price Each	Price Total	Reported in *Railway Age* Issue of Financing	Order
Ann Arbor	3	0-8-0	200,000	American	38,925	116,775	Aug. 20 (L.F.)	March 19
Atchison, Topeka & Santa Fe	30	2-8-2	322,920	Baldwin	.....	.....	.....	.....
	10	2-10-2	375,400	Baldwin	.....	.....	.....	.....
	10	4-8-2	338,310	Baldwin	.....	.....	.....	.....
	50				85,978	4,298,900	July 16 (L. F.)	April 2
Atlantic Coast Line	25	4-6-2	277,000	American	57,407	1,435,175	Dec. 31 (E. T.)	March 26
	5	0-6-0	163,600	Baldwin	47,600	238,000	Dec. 31 (E. T.)	May 28
Baltimore & Ohio	50	2-8-2	300,000	Baldwin	84,000	4,200,000	Dec. 31 (L. F.)	Sept. 24
Bangor & Aroostook	6	2-8-0	211,000	American	60,000	360,000	July 16 (L. F.)	July 9
Central of Georgia	7	4-8-2	316,000	American	67,857	475,000	Aug. 6 (L. F.)	April 30
Chesapeake & Ohio	20	2-6-6-2	441,000	American	89,990	1,799,800	Dec. 17 (L. F.)	April 9
	5	0-10-0	295,000	American	63,650	318,250	Dec. 17 (L. F.)	April 9
Chicago & North Western	40	2-8-2	302,000	American	73,413	2,936,520	Dec. 10 (L. F.)	July 30 & Sept. 10
	20	4-6-2	260,000	American	66,625	1,332,500	Dec. 10 (L. F.)	July 30
Chicago Great Western	10	2-8-2	284,400	Baldwin	55,200	552,000	Aug. 20 (L. F.)	Feb. 13
Chicago, Rock Island & Pacific	15	2-10-2	383,000	American	78,673	1,180,085	Nov. 12 (L. F.)	April 30
	10	2-8-2	327,000	American	66,705	667,050	Nov. 12 (L. F.)	April 30
	10	4-8-2	340,000	American	70,103	701,030	Nov. 12 (L. F.)	April 30
Chicago, St. Paul, Minneapolis & Omaha	6	2-8-2	320,000	American	72,450	434,700	Aug. 27 (E. T.)	.....
	4	0-6-0	164,000	American	46,400	185,600	Aug. 27 (E. T.)	.....
Cleveland, Cincinnati, Chicago & St. Louis	10	0-8-0	217,000	Lima	47,559	475,592	Dec. 31 (L. F.)	April 9
	10	4-6-2	282,000	American	58,380	583,800	Dec. 31 (L. F.)	April 9
	50	2-8-2	328,000	American	68,040	3,401,968	Dec. 31 (L. F.)	April 9
Great Northern	45	2-8-2	320,000	Baldwin	51,111	2,750,000	Aug. 6 (L. F.)	March 12
Gulf, Mobile & Northern	4	2-8-2	205,800	Baldwin	37,900	227,400	Nov. 19 (L. F.)	Aug. 6
	2	Switch	.....					
Illinois Central	50	2-10-2	380,000	Lima	87,700	4,385,000	Oct. 29 (E. T.)	May 28
	25	4-6-2	278,000	American	64,925	1,623,125	Oct. 29 (E. T.)	May 28
Michigan Central	6	0-8-0	217,000	Lima	47,300	283,800	Dec. 31 (L. F.)	April 9
	10	4-6-2	282,000	American	58,340	584,000	Dec. 31 (L. F.)	April 9
	10	2-8-2	328,000	American	69,251	692,505	Dec. 31 (L. F.)	April 9
Minneapolis & St. Louis	15	2-8-2	262,000	American	64,365	965,475	.....	June 25
New York Central	50	0-8-0	217,000	Lima	47,328	2,366,400	Dec. 31 (L. F.)	April 9
	20	4-6-2	282,000	American	58,440	1,166,800	Dec. 31 (L. F.)	April 9
	10	2-6-6-2	364,000	American	82,400	824,000	Dec. 31 (L. F.)	April 9
	3	0-8-8-0	468,000	American	92,000	276,000	Dec. 31 (L. F.)	April 9
Northern Pacific	6	2-8-8-2	476,000	American	101,964	611,785	Nov. 5 (L. F.)	May 7
	20	4-6-2	296,000	American	70,444	1,408,878	Nov. 5 (L. F.)	May 7
	25	2-8-2	335,000	American	73,370	1,834,215	Nov. 5 (L. F.)	May 7
	24	0-8-0	214,000	American	51,748	1,241,953	Nov. 5 (L. F.)	May 7
Southern Pacific	15	2-10-2	388,500	Baldwin	75,540	1,888,500	Nov. 12 (L. F.)	April 30, July 23
	10	2-8-2	.....	Co. shops				
	2	Electric	.....	Bald. West	42,500	85,000	Nov. 12 (L. F.)	.....
	10	0-6-0	155,700	Baldwin	37,770	906,500	Nov. 12 (L. F.)	April 30, July 23
	14	0-6-0	.....	Co. shops				
Western Maryland	20	2-8-0	296,000	Baldwin	75,000	1,500,000	Oct. 1 (L. F.)	Sept. 24

Freight Cars

Road	No.	Type	Capacity	Construction	Builder	Price Each	Price Total	Reported in *Railway Age* Issue of Financing	Order
Atchison, Topeka & Santa Fe	500	Gondola	100,000	St. fr.	Am. C. & F.	3,003	1,501,500	July 16 (L. F.)	Mar. 26
	1,250	Refrig.	80,000	St. unf.	Am. C. & F.	4,750	11,875,000	July 16 (L. F.)	Mar. 26
	1,250	Refrig.	80,000	St. unf.	Has. & Bar.				
Atlantic Coast Line	100	Phosphate	.....	St. unf.	.....	2,960	296,000	Dec. 31 (E. T.)	.....
	500	Vent. Box	80,000	St. unf.	Std. Steel	3,718	1,859,090	Dec. 31 (E. T.)	May 28
	400	Hopper	100,000	Steel	Std. Steel	3,021	1,208,364	Dec. 31 (E. T.)	Aug. 6
	100	Phosphate	.....	St. unf.	.....	3,324	332,466	Dec. 31 (E. T.)	.....
Baltimore & Ohio	1,000	Box	80,000	St. unf.	Mt. Vernon	2,629	2,629,000	Dec. 31 (L. F.)	May 7
	1,200	Hopper	100,000	Steel	Pressed St.	1,919	2,302,800	Dec. 31 (L. F.)	May 7
	500	Refrig.	70,000	St. unf.	Am. C. & F.	2,800	1,400,000	Dec. 31 (L. F.)	Sept. 17
Central of Georgia	100	Stock	.....	St. unf.	.....	2,500	250,000	Aug. 6 (L. F.)	Aug.
	500	Vent. box	.....	St. unf.	.....	3,000	1,500,000	Aug. 6 (L. F.)	.....
	200	Gondola	.....	St. fr.	.....	2,800	560,000	Aug. 6 (L. F.)	.....
Chesapeake & Ohio	1,000	Gondola	200,000	Steel	500 Pr. St.	6,000	6,000,000	Dec. 17 (L. F.)	June 4
					500 Std. St.			Dec. 17 (L. F.)	June 4
Chicago, Rock Island & Pacific	50	Caboose	.....	St. unf.	Std. Steel	4,464	223,200	Nov. 12 (L. F.)	.....
	500	Gondola	.....	.....	Bettendorf	3,300	1,650,000	Nov. 12 (L. F.)	Apr. 9
Chicago & North Western	500	Ore	100,000	Steel	Pullman	2,284	1,142,000	Dec. 10 (E. T.)	May 21
	500	Stock	80,000	St. unf.	Gen. American	2,605	1,302,500	Dec. 10 (E. T.)	Aug. 6
	250	Refrig.	80,000	St. unf.	Am. C. & F.	4,872	1,218,000	Dec. 10 (E. T.)	Sept. 10
	50	Caboose	.....	St. unf.	Am. C. & F.	4,112	205,600	Dec. 10 (E. T.)	Sept. 10
Chicago, St. Paul, Minneapolis & Omaha	125	Stock	.....	.....	.....	2,740	342,400	Aug. 27 (E. T.)	.....
Cleveland, Cincinnati, Chicago & St. Louis	500	Box	100,000	Steel	Std. Steel	3,662	1,830,760	Dec. 31 (L. F.)	Apr. 9
	500	Auto	100,000	Steel	Has. & Bar.	3,722	1,860,760	Dec. 31 (L. F.)	Apr. 9
	1,750	Hopper	110,000	Steel	Am. C. & F.	2,577	5,154,100	Dec. 31 (L. F.)	Apr. 9
	250	Hopper	110,000	Steel	Std. Steel				
	100	S. d. Stock	80,000	St. unf.	Has. & Bar.	2,950	295,000	Dec. 31 (L. F.)	Apr. 23
Great Northern	500	Ore	150,000	Steel	Am. C. & F.	2,540	2,540,000	Aug. 6 (L. F.)	Feb. 20
	500	Ore	150,000	Steel	Has. & Bar.				
Illinois Central	1,000	Refrig.	60,000	St. unf.	Pullman	4,255	4,255,000	Oct. 29 (E. T.)	July 9
	200	Flat	100,000	Steel	Bettendorf	2,370	474,000	Oct. 29 (E. T.)	July 23
	300	Stock	80,000	St. fr.	Am. C. & F.	2,920	876,000	Oct. 29 (E. T.)	July 23
	50	Caboose	.....	.....	Freese & Swenson	3,000	150,000	Oct. 29 (E. T.)	.....
Michigan Central	1,000	Auto	100,000	Steel	Am. C. & F.	3,722	3,721,520	Dec. 31 (L. F.)	Apr. 9
	500	Hopper	110,000	Steel	Pressed Steel	2,577	1,288,675	Dec. 31 (L. F.)	Apr. 9
	100	S. d. Stock	80,000	St. unf.	Has. & Bar.	2,950	295,000	Dec. 31 (L. F.)	Apr. 23
	100	D. d. Stock	80,000	St. unf.	Has. & Bar.	3,125	312,500	Dec. 31 (L. F.)	Apr. 23
	250	Refrig.	69,000	St. unf.	Mer. Des.	4,008	1,002,000	Dec. 31 (L. F.)	Apr. 23
Minneapolis & St. Louis	500	Box	.....	.....	.....	3,000	1,500,000	.....	.....
	500	Gondola	.....	.....	.....	2,800	1,400,000	.....	.....
	200	Refrig.	.....	.....	.....	3,800	760,000	.....	.....
	500	Other	.....	.....	.....	2,600	1,300,000	.....	.....
New York Central	1,000	Box	100,000	Steel	Std. Steel	3,660	3,660,000	Dec. 31 (L. F.)	Apr. 9
	750	Auto	100,000	Steel	Am. C. & F.	3,720	3,720,000	Dec. 31 (L. F.)	Apr. 9
	250	Auto	100,000	Steel	Std. Steel				
	1,500	Hopper	110,000	Steel	Std. Steel	2,443	3,664,000	Dec. 31 (L. F.)	Apr. 9
	494	S. d. Stock	80,000	St. unf.	Mer. Des.	2,930	1,457,200	Dec. 31 (L. F.)	Apr. 23
	200	D. d. Stock	80,000	St. unf.	Has. & Bar.	3,122	624,500	Dec. 31 (L. F.)	Apr. 23
Northern Pacific	300	Hart. conv.	100,000	St. fr.	Am. C. & F.	3,745	1,123,374	Nov. 5 (L. F.)	Apr. 23
	60	Air dump	.....	.....	.....	5,000	300,000	Nov. 5 (L. F.)	.....
	100	Caboose	.....	St. center sills	Pac. Car. & Fdy.	3,500	350,000	Nov. 5 (L. F.)	Oct. 22
	1,000	Box	.....	St. unf.	.....	2,500	2,500,000	Nov. 5 (L. F.)	.....
Southern Pacific	2,000	Box	80,000	.....	Co. Shops	3,200	6,400,000	Nov. 12 (L. F.)	Apr. 9
	1,000	Flat	100,000	.....	Co. Shops	2,400	2,400,000	Nov. 12 (L. F.)	Apr. 9
	1,000	Stock	80,000	.....	Co. Shops	2,750	2,750,000	Nov. 12 (L. F.)	Apr. 9
	500	Auto	100,000	.....	Std. Steel	3,310	1,655,000	Nov. 12 (L. F.)	May 21
	250	Ballast	100,000	.....	Mt. Vernon	3,682	920,500	Nov. 12 (L. F.)	May 21
	65	Caboose		.....	Co. Shops	3,492	227,100	Nov. 12 (L. F.)	Apr. 9

PASSENGER CARS

Road	No.	Type	Construction	Builder	Price Each	Price Total	Reported in *Railway Age* Issue of Financing	Order
Atlantic Coast Line	25	Coaches	Steel	Pullman	$34,036	$850,905	Dec. 31 (E. T.)	May 21
Chicago & Northwestern	25	Coach	Steel	Am. C. & F.	26,771	669,275	Dec. 10 (E. T.)	Sept. 10
	9	Smoking	Steel	Am. C. & F.	25,979	233,811	Dec. 10 (E. T.)	Oct. 22
	2	Postal	Steel	Am. C. & F.	27,500	55,000	Dec. 10 (E. T.)	.....
	23	Baggage	Steel	Am. C. & F.	22,000	506,000	Dec. 10 (E. T.)	.....
	3	Mail and Baggage	Steel	Am. C. & F.	27,500	82,500	Dec. 10 (E. T.)	.....
Illinois Central	20	Suburban	Steel	Pullman	29,880	597,600	Oct. 29 (E. T.)	Sept. 17
	12	Compartment	Steel	Pullman	36,539	438,468	Oct. 29 (E. T.)	July 23
	18	Baggage	Steel	Pullman	26,650	479,700	Oct. 29 (E. T.)	July 23
	5	Dining	Steel	Pullman	51,005	255,025	Oct. 29 (E. T.)	July 23

month or two, one of the reasons being that details are not yet available for the public, the other and equally important reason being that so few orders have been placed. It is for this reason primarily that there are introduced in Table IV the relative prices of several basic iron and steel commodities which enter into car and locomotive manufacture. These prices have also been platted on a diagram, but, however they are shown, the rise to the peak in the early months of the year and the rapid decline in the latter months is plainly indicated. The prices of cars and locomotives presumably do not vary exactly with these commodity prices, but the lag behind them is not great. Investigation shows that car and locomotive prices have shown a decline in the last month or two. They are now approximately 10 per cent below the peak prices of the year. This, however, is discussed in greater detail in other articles in this issue, so that extended comment on this factor is not necessary.

Dividend Changes on Railroad Stocks in 1920

Chicago & North Western Reduced Rate. Nickle Plate Declared Dividends on Three Classes

INASMUCH as the larger proportion of the railroads accepted the government's guaranty of net railway operating income for the six months following the termination of federal control, the dividend changes for the year were not many. The Chicago & North Western reduced its regular dividends on the common stock from 7 to 5 per cent and on its preferred from 8 to 7. The precarious situation of the New England roads resulted in the passing of dividends on the Boston & Maine and Maine Central. The New York, Chicago & St. Louis, however, which declared 2½ per cent on its second preferred stock only last year, this year declared 7½ per cent on that class of stock, 10 per cent on its first preferred, and 5 per cent on its common stock. Increases in dividends were also made by the Chicago, Indianapolis & Louisville, the New Orleans, Texas & Mexico and the Western Pacific.

In the case of the Boston & Maine, the reorganization provided that dividends should be paid on the preferred stock if earned at the rate of 4 per cent from January 1, 1919, to January 1, 1924, and at the rate of 6 per cent thereafter. A dividend of $2.67 per share was declared in January as an adjustment covering eight months to September 1, 1919. It was the first dividend on the preferred stock since March 1, 1913. On July 1 dividends were paid on this stock as follows: Class A, $2.00 per share; Class B, $3.20; Class C, $2.80; Class D, $4.00; Class E, $1.80. The uncertainty as to the matter of divisions of through rates made it necessary in December, however, to omit the dividend which would have been paid January 1, 1921.

The reductions of the regular dividends on the Chicago & North Western common and preferred stocks were made in June. The rate on the common was reduced from 1¾ per cent quarterly (7 per cent annually) to 2½ per cent semi-annually (5 per cent annually) and on the preferred from 2 per cent quarterly (8 per cent annually) to 3½ per cent semi-annually (7 per cent annually). An officer of the company explained the reason for this action thus: "The rate of dividends on the preferred and common stocks had been reduced because, in the judgment of the board, the uncertainties of the present railroad situation made such a course advisable."

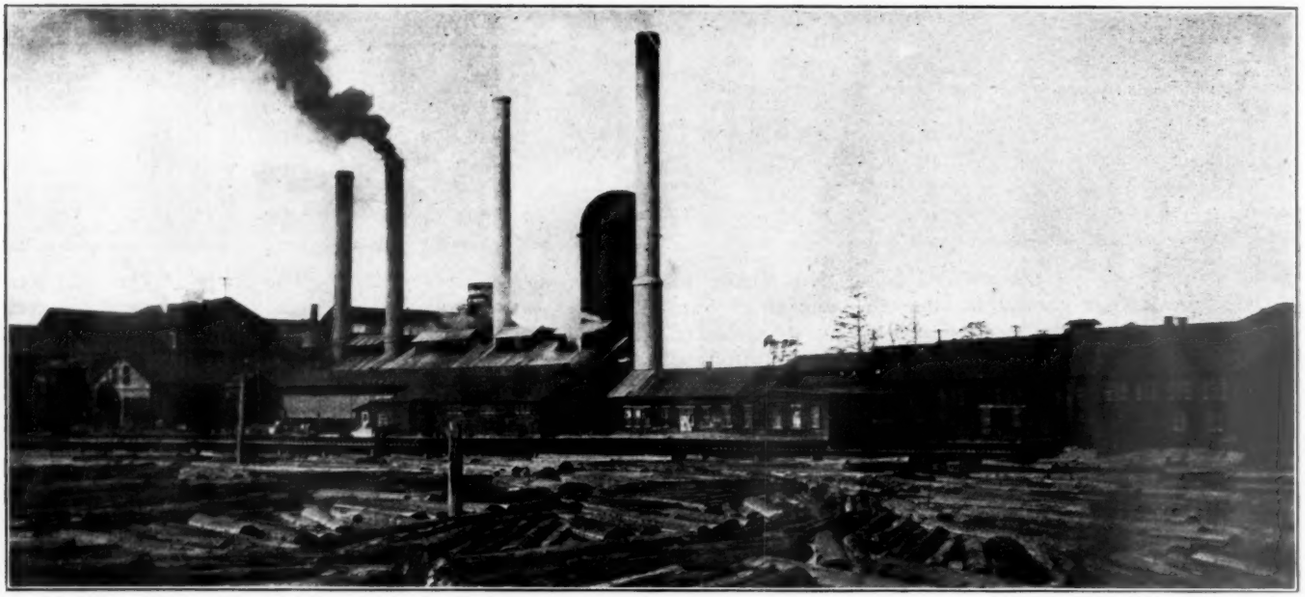
Dividends on the common stock of the Chicago, Indianapolis & Louisville were resumed in January after an intermission of two years with the declaration of a semi-annual dividend of 1¾ per cent. This was followed by a 1⅝ per cent dividend in June.

The Maine Central's usual dividend on the preferred stock has been at the rate of 1¼ per cent quarterly. At a meeting in November no action was taken on the matter of the usual quarterly dividend, this being the first time in the company's history that one has not been declared.

The New York, Chicago & St. Louis this year declared dividends of 10 per cent on its first preferred stock, 7½ per cent on its second preferred, and 5 per cent on its common stock. As to the preferred stock, 5 per cent was declared in January, representing presumably the payments due in January and July, 1919; the remaining 5 per cent on this stock was declared in June. Dividends on this first preferred stock have been paid at the rate of 5 per cent for many years. On the second preferred stock, dividends were paid at the rate of 2½ per cent in January and July, 1917, and in January, 1918. The next dividend was 2½ per cent in July, 1919. The dividends declared on this stock in 1920 were 2½ per cent in April and 5 per cent in July. The common stock dividend of 5 per cent declared in December was the first dividend on this stock since March, 1913, when 4 per cent was paid.

DIVIDEND CHANGES

Name of road	Per cent declared in 1920	Per cent declared in 1919	Annual rate in 1920	Annual rate in 1919
Boston & Maine, preferred—				
All series	2.67	..	..	..
Series A	2.00	..	..	..
Series B	3.20	..	..	..
Series C	2.80	..	..	..
Series D	4.00	..	..	..
Series E	1.80	..	..	..
Chicago & North Western, common	6	7	5	7
Chicago & North Western, preferred	7½	8	7	8
Chicago, Indianapolis & Louisville, common	3⅝	..	3½	..
Maine Central, preferred	3¾	5	..	5
New Orleans, Texas & Mexico, common	1½	..	..	..
New York, Chicago & St. Louis, common	5	..	..	..
New York, Chicago & St. Louis, 1st preferred	10	..	5	5
New York, Chicago & St. Louis, 2nd preferred	7½	2½	..	..
Western Pacific R. R. Corp., preferred	5¾	4	..	4



A Lumber Mill in the Humboldt Region of California. Photo by Ewing Galloway, N. Y.

Prices for Engineering and Maintenance Material

Well-Defined Reduction in Prices of Most Basic Materials—Indications That Others Will Follow

THERE HAS BEEN a well-defined reduction in the prices of most of those basic materials which make up the bulk of the purchases of the railways for tracks and structures and also determine, in large measure, the contract prices for bridge and building work. This decline has been quite general throughout the entire fields of iron and steel and of lumber, while as to those particular materials for which no reductions have been announced, every indication points to an adjustment in the near future which will bring the remaining items to the general level.

PRICES OF MOST of the basic materials used in tracks and structures have declined.

Steel Corporation quotations of $45 and $47 appear to be the prevailing prices for rail.

Lumber and tie prices in the course of readjustment.

Cement prices have not been reduced.

Thus far it is difficult to predict the trend of prices for finished products in the form of equipment or fixed structures.

Rails on Lower Basis

The case of rail is of particular interest because of the primary importance of this item and also on account of the close relation which the history of this commodity bears to the welfare of the railroads. Following the formation of the United States Steel Corporation, early in the present century, the prices of Bessemer and open-hearth rails were fixed at $28 and $30 per gross ton, respectively, and these prices were maintained until May, 1916, when they were advanced to $33 and $35. They were raised again in December, 1916, to $38 and $40 and this higher level was maintained all through 1917.

In 1918, following the formation of the United States Railroad Administration, rail prices ceased to have a real meaning. However, the nominal figures of $55 and $57 were set up as the established prices and a few orders for small tonnages from roads outside of the Railroad Administration brought prices ranging from these figures to as much as $65 per ton. In 1919, in the course of the efforts of the Industrial Board organized to fix a scale of prices agreeable to both the steel manufacturers and the government, the tentative figures of $45 and $47 were named for Bessemer and open-hearth rail, respectively, but owing to the fact that Director General Hines considered these figures too high and refused to be bound by them, a deadlock ensued which may be said to have continued as long as the Railroad Administration remained in existence. The United States Steel Corporation, however, established these figures as the standard prices for rails and continued them in effect during 1919 and 1920. The independent manufacturers contended that they were too low and set up quotations $10 or more in excess of them.

When the railroads came into the market last fall for 1921 rail, a further uncertainty arose. There was talk of higher prices and the manufacturers would not agree to close contracts on the existing basis. Consequently, the railroads arranged for rolling reservations with prices left undecided. However, the influences which have caused the general reductions in prices became effective and various announcements made by officers of the United States Steel Corporation have served to continue the established prices tentatively into 1921. No specific action has been taken by

the independent manufacturers as regards rails, but in view of the fact that they have generally adjusted their quotations for other iron and steel commodities used in the maintenance of way department to the established bases, it is believed that the $45 and $47 quotations have been pretty well established as the prevailing prices.

In the meantime another factor has been introduced in the revision of the United States Steel Corporation's extra charges for the use of various specifications or test requirements. Thus, the charge for the nick and break test has been raised from $0.80 to $1.60. The Pennsylvania's specifications as applied to 130-lb. rail call for extras totaling $8.90 instead of $5.80, while the A. R. E. A. 1920 specifications call for a premium of $11.80 per ton.

The history of prices for track fastenings for the last 20 months has followed the same general trend as that of rail. The prices adopted by the Industrial Board were established as standard by the leading steel interest, but disregarded by the others, who gradually advanced their prices until they were 75 per cent or more in excess of the fixed standards. These established base prices, however, applied only to orders for very remote delivery, so that the actual prices for reasonable deliveries were really those asked by the independents.

In the last few months with the falling off of business and the announcement that the established prices would be continued into 1921, the other manufacturers have gradually lowered their prices to the "corporation" figures. At the same time there has been some readjustment of the established prices. For instance, the price of track spikes, which was as high as 7 cents per pound in 1917, was fixed at 3.35 cents by the Industrial Board in March, 1919. During the past year the actual sale prices for spikes advanced to about 4.25 cents. This was carried down with the decline but instead of going to 3.35 cents, the hitherto established standard, a new figure of 3.65 cents seems to have become the base. A somewhat similar situation maintains with respect to track bolts. Iron tie plates which were fixed at 2.90 cents in March, 1919, were sold at 4 cents or more, but have recently been offered at 3 cents.

In the case of fabricated structural steel there has not been enough business in recent weeks to establish prices for the railroads, but owing to the fact that there is a well-defined relation between the prices of plain and fabricated materials, the prevailing price of the former offers a reasonably good index of the pound price required by the fabricator. Therefore, it suffices to say that the prices of 2.65 and 2.45 cents established in 1919 for plates and shapes, respectively, have now been definitely restored and there have even been some suggestions of reductions below these established figures. The prices paid for finished structural steel in 1920 were somewhat higher than in 1919, and practically the same as in 1918, but in view of the definite reduction in the plain material prices, there should be a considerable reduction in the present fabricated prices. In this connection, it is well to note that the spread between the price of the plain and fabricated materials is always smallest when the shops have a minimum of work in hand, as is the case at present.

Lumber and Ties

The lumber trade has gone through an interesting transition during the past year. Following the abandonment of price fixing by the War Industries board, the price of lumber advanced steadily. With the increased impetus to business at the beginning of 1920, there was a runaway market. The demand exceeded the supply and prices previously unheard of resulted. This led to an abrupt cessation of building activities, with the result that the mills were unable to curtail production as rapidly as the demand for lumber fell off. As a consequence of this the stocks of the mills were speedily restored to normal, but the prices did not decline materially until about September, 1920. By the middle of December there had been reductions from 10 to 35 per cent below the prices prevailing in July. Thus, we find that some items of southern pine are only slightly above the general range of prices in January, 1918, while as to other items the cost is still appreciably higher. In the case of Douglas fir the reduction in mill prices has been more pronounced because the change in railway rates has effected some modification of the differential between Douglas fir and southern pine prices in various markets. As a consequence, Douglas fir mill prices have fallen from 20 to 40 per cent and are at present not far in excess of the January, 1918, figures.

The history of the tie market during the months which followed the return of the railways to private management is one of vital interest to railway men concerned with the purchase and use of ties, because of the radical reorganization of purchasing methods instituted during the period of government control. Purchases were centralized, uniform prices were set up and standard specifications were established. Because the changes had been so marked and owing to the fact that the return from government to private management was timed so as to come almost exactly between the seasons of tie purchase and tie delivery, no little anxiety was felt in many quarters concerning the disruption of commercial relations in the tie industry with the change of control.

In a measure these fears were justified by the subsequent occurrences. Many of the roads made no arrangements for the purchase of ties until after the return to private control, with the result that in some quarters there was a general scramble to obtain the available supplies. This was notably the case in the sawed tie markets of the south, the condition being aggravated by the fact that this urgent demand for ties came at a time when the commercial lumber mills were flooded with orders in the regular lumber trade. A further complication resulted from the fact that certain Eastern roads which had normally obtained appreciable portions of their supplies locally entered tie markets far outside of their normal fields of operation.

But one result could follow this train of circumstances—the established government prices for ties were superseded by higher quotations following closely the general tendency of the lumber market. This condition was not universal. The railroads that had been so fortunate as to obtain the bulk of their supplies from small producers along their own lines fared much better. Some roads so situated were able to procure ties in the required amounts at the United States Railroad Administration tie prices throughout most of the year, although there were some adjustments upward in the early fall. These roads generally adhered closely to the standard specifications promulgated by the Railroad Administration, but in the markets subjected to more severe competition on the part of the purchasers the standard specifications were frequently modified. Certain railroads also restored the specifications which they had observed before the period of government control.

With the advent of the readjustment period, during the late months of 1920, and following the break in the lumber market there was a general falling off in the prices of sawed ties, corresponding in a general way to the reduction in lumber prices. With this a complete change of front has taken place in the tie market; contractors have endeavored to deliver more ties than contracts called for, and several roads have found it desirable to reduce their supplies by throwing quantities of ties on the market. In the meantime railway tie agents are being approached daily by dealers with large supplies of ties ready to deliver. The adjustment of prices possible under such a condition in the market has not been completed, particularly in the case of hewn ties, but it is expected that some roads will soon be able to reduce

their prices to the small producer appreciably below the Administration standards.

Cement Prices Not Reduced

The Portland cement prices are distinctive in having shown little or no indication of deviation from the prices prevailing for the last year or more. The trend of prices since October, 1917, is indicated by the following figures taken by averaging quotations prevailing in from 6 to 10 middle-western cities between Pittsburgh and the Twin Cities, inclusive, these prices being per barrel, not including package: March, 1917, $1.61; October, 1917, $1.94; March, 1919, $2.24; November, 1919, $2.15; October, 1920, $2.55. The last figure represents an advance of 50 per cent over the price of March, 1917.

Finished Products

In the case of finished products in the form of equipment or fixed structures the reduction in prices thus far has not been so noticeable. As a case in point, inquiry of the leading signal manufacturers soliciting information as to the tentative prices during the coming year brought no response that predicted a reduction in price. Some of the replies intimated advances up to 25 per cent, but the majority expressed an inability to estimate price tendencies at this time.

Boards of Referees May Consider Maintenance Claims

WASHINGTON, D. C.

THE BOARD OF REFEREES appointed by the Interstate Commerce Commission to report to the President what would be just compensation for the use of the property of the Western Pacific during federal control has made a formal ruling that it has jurisdiction over all claims arising out of federal control, and is not confined to the question of the annual rental, thereby overruling an objection by the Railroad Administration to the introduction of testimony to prove under-maintenance. The ruling is as follows:

"Counsel for the respondent has objected to certain evidence offered by plaintiff upon the ground that the jurisdiction of this board 'is limited to the making of a report to the President as to the amount of annual rental which shall form the basis of an agreement with the carrier as provided in section one of the federal control act' and that the evidence is offered in support of items of compensation that cannot be stated in our report in the form of annual rent. In support of the objections counsel relies upon the following language of section 3 of the federal control act:

> Said boards * * * shall report * * * the just compensation, calculated on an annual basis and otherwise in such form as to be convenient and available for the making of such agreement as is authorized in section one.

"In our opinion the objections should be overruled for the following reasons:

"Section 3 of the federal control act provides that all unadjusted claims for just compensation shall be submitted to boards of referees for consideration and report. That section also provides that such boards shall make a report of the just compensation in each case so submitted. In our opinion the provisions of section 3, upon which counsel for the respondent relies, merely prescribe the form in which our conclusions as to the just compensation shall be reproduced in the report which the statute requires us to make, therefore, those provisions do not limit our jurisdiction and have no reference to jurisdiction. So far as we are now informed we can, in literal compliance with the statute, report every item of just compensation claimed in this case, which may be proved, either calculated on an annual basis or otherwise in such form as to be convenient and available for the making of such agreement as is authorized in section one of the federal control act.

"Section one of the federal control act, after reciting that the President having in time of war taken over the possession, use, control and operation of certain systems of transportation, gave the President power, within certain maximum limits, to agree with the owners of the systems of transportation as to their just compensation. In the event of failure to reach an agreement the following provisions of that statute become operative:

> That all claims for just compensation not adjusted (as provided in section one) shall, on the application of the President or of any carrier, be submitted to boards, each consisting of three referees to be appointed by the Interstate Commerce Commission.

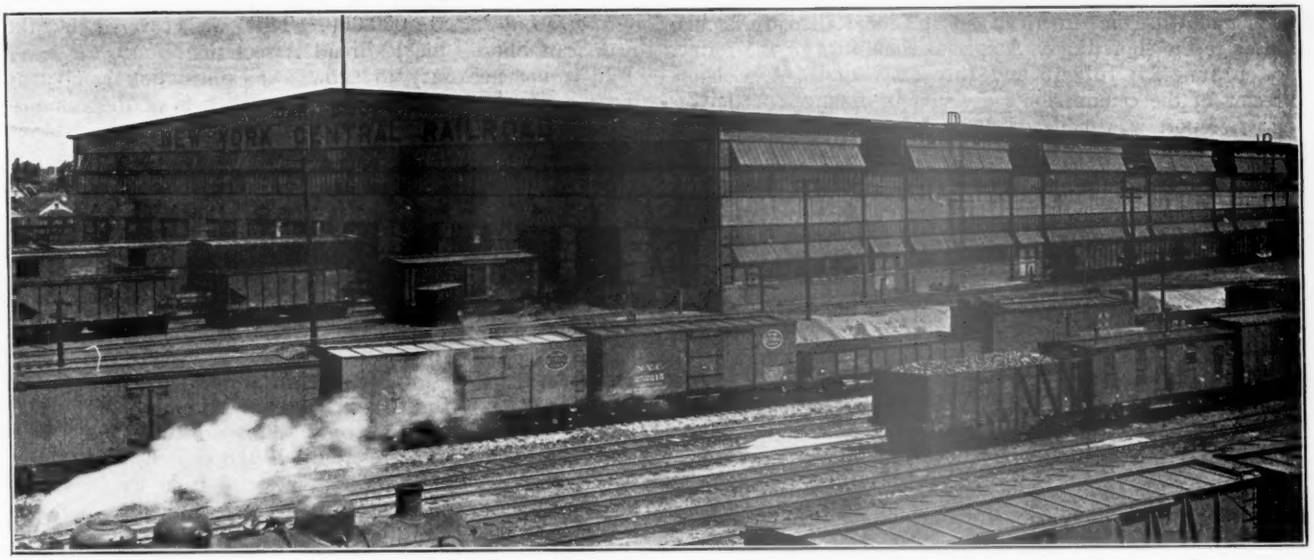
"The statute contemplated that the report of the board of referees would enlarge the power of the President to agree with claimant carriers, the provisions to that effect being as follows:

> The President is authorized to enter into an agreement with such carrier for just compensation upon a basis not in excess of that reported by such board, and may include therein provisions similar to those authorized under section one. Failing such agreement, either the United States or such carrier may file a petition in the court of claims for the purpose of determining the amount of such just compensation, and in the proceedings in said court the report of said referees shall be prima facie evidence of the amount of just compensation and of the facts therein stated.

"During the period of federal control railroad corporations of course could not compute the amount of their claims that might arise for under-maintenance of their property and for many acts of omission or commission ascribable to the United States during that period, but it was then obvious that at the end of federal control losses from under-maintenance and all forms of losses to the railroad corporations could be measured and claimed. Having in mind the ending of federal control and the relinquishment of the railroad properties to the owners thereof, Congress passed an act, the transportation act, 1920, which provides in part as follows:

> Sec. 200 (a). Federal control shall terminate at 12:01 a. m., March 1, 1920; and the president shall then relinquish possession and control of all railroads and systems of transportation then under federal control and cease the use and operation thereof.
>
> Sec. 202. The President shall, as soon as practicable after the termination of federal control, adjust, settle, liquidate and wind up all matters, including compensation, and all questions and disputes of whatsoever nature, arising out of or incident to federal control.
>
> Sec. 203 (a). Upon the request of any carrier entitled to just compensation under the federal control act, but with which no contract fixing or waiving compensation has been made and which has made no waiver of compensation, the President, (1) shall pay to it so much of the amount he may determine to be just compensation as may be necessary to enable such carrier to have the sums required for interest, taxes and other corporate charges * * * and (2) may, in his discretion, pay to such carrier the whole or any part of the remainder of such estimated amount of just compensation.
>
> (b) The acceptance of any benefits by a carrier under this section—
>
> (1) Shall not deprive it of the right to claim additional compensation, which, unless agreed upon, shall be ascertained in the manner provided in Sec. 3 of the Federal Control Act.

"A full consideration of the issues presented to us in this case at this time leads us to the conclusion that as during the period of federal control the jurisdiction of boards of referees, in cases submitted to such boards, appears to have been substantially the same as to the subjects to be considered as was the President's, to make settlements by agreement, so in the present case the board of referees has jurisdiction to determine the compensation as to all claims arising out of or incident to federal control which the President under the transportation act is authorized to adjust and settle. Therefore, the objections are overruled."



New York Central Car Shops at Toledo. Photo by Ewing Galloway, N. Y.

The Use of the $300,000,000 Revolving Fund

Loans Certified by I. C. C. Now Over $170,000,000—Payments by Treasury $130,000,000

THE $300,000,000 LOAN FUND provided by Section 210 of the Transportation Act is one of the most interesting of the many interesting features of the Transportation Act. It represented something entirely new in railroad finance. The uses to which it has thus far been put indicate that its inclusion in the railroad law marked real progress. The fund has served as an important factor in the rehabilitation of the railroad systems of the country.

THE LOAN FUND provided by Section 210 of the Transportation Act has proved of material assistance to rail carriers in securing new equipment, making other additions and betterments and meeting maturities.

Delays have been experienced in administrating the fund because of questions as to interest rates of accompanying finance and as to payments by Treasury; but these difficulties are now overcome.

Loans now approved total over $170,000,000.

Terms of the Law

The full text of Section 210 of the Transportation Act, as amended by Section 5 of the Sundry Civil Appropriations Act of June 5, 1920, is given elsewhere in this article. It will be noted that the section provides that applications for loans may be made, "For the purpose of enabling carriers by railroad subject to the Interstate Commerce Commission properly to serve the public during the transition period immediately following the termination of federal control." A loan may be made to a carrier to enable it "to meet its maturing indebtedness, or to provide itself with equipment or other additions and betterments." It is further provided that application for a loan may be made "at any time after the passage of this Act and before the expiration of two years after the termination of federal control." The commission may certify its approval of a loan if it finds that the loan "is necessary to enable the applicant properly to meet the transportation needs of the public, and that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan." The loan must be repaid within a period not exceeding 15 years from the making thereof. All loans bear interest at the rate of 6 per cent, payable semi-annually, and payments of principal and interest are to be placed to the credit of the revolving fund.

It is also provided that the commission must find that "the applicant, in the opinion of the commission, is unable to provide itself with the funds necessary for the aforesaid purposes from other sources." The amount appropriated, as above noted, was $300,000,000.

Principles Established

Among the first steps taken by the commission in its handling of the $300,000,000 loan fund thus provided for, was to establish certain principles. These were announced on June 7. They were to the general effect that there should be used for equipment $125,000,000 (of which $75,000,000 was to be for freight cars and $50,000,000 for locomotives), for additions and betterments to promote the movement of cars $73,000,000, and for maturities $50,000,000. An amount of $12,000,000 was set aside for the short line carriers.

The matter of the loans was taken up with the Association of Railway Executives as to the applications of the larger

roads and with the American Short Line Railroad Association as to the short lines. A special committee of the former met on June 25, July 15 and July 22, with W. A. Colston, director of the commission's division of finance, participating. A report was made on June 26 and a final report on July 28. In this report the committee announced its approval of loans as follows:

Association of Railway Executives' Recommendations

Additions and betterments to existing equipment: To 15 carriers, $10,724,785. This expenditure, it was noted, would restore to efficient service 15,168 cars.

Freight and switching locomotives: To 31 carriers, $27,173,186. In this case of recommending loans to aid in the purchase of new locomotives the committee followed a suggestion of the commission that the locomotives purchased should be financed 50 per cent from the loan fund and 50 per cent by the carriers. Thus, it was expected that the loans, totaling $27,173,186, would assist in the expenditure of $53,346,372, covering 636 freight locomotives and 277 switching locomotives. No recommendations for loans to aid in the purchase of passenger locomotives were made.

Freight train cars: To 21 carriers, including the Fruit Growers' Express, $51,754,455. Inasmuch as it was the desire of the commission to have this money used for as many cars as possible, the recommendations in general provided for the financing of only 25 per cent of the cost of the cars from the fund, the remaining 75 per cent to be financed by the carrier. There were, however, certain exceptions. The amount of $51,754,455 was expected to aid in the purchase of 46,027 freight train cars of a total approximate value of $146,646,510. The commission had suggested that if possible 20,000 refrigerator cars be provided for. The committee's recommendations covered only 7,950, but explicit reasons were given showing that such cars in sufficient quantity were being obtained through the assistance of the loan and in other ways.

Reserve for smaller carriers other than short lines: The committee recommended the setting aside of $3,000,000 for these carriers for equipment and $2,000,000 for additions and betterments to way and structures.

Maturities: To nine carriers $28,800,875.

Short Lines: $12,000,000. This was covered by the American Short Line Railroad Association.

It is not necessary to show a recapitulation comparing these recommendations with the suggestions of the commission. The recommendations are shown in full in the detailed list by roads which is given below.

The Going Rate for Money

The handling of the loan fund, thus so auspiciously started, has met with two rather disconcerting snags since these recommendations were made. One was in connection with the interest rate which the roads should secure in the financing to meet the government loan. The attempt was made to keep the interest rate down to 7 per cent. Some carriers were able, through special conditions, to meet this condition, despite the fact that the going rate for money at the time was 7½ or 8 per cent. This difficulty was finally overcome, but not, however, until it had caused much delay. The commission relented in a measure from its strictness. The fact that the loans made from the fund were at 6 per cent no doubt had considerable to do nevertheless with holding down interest rates.

Treasury Holds Up Payments

The other snag arose in connection with the certifications to the Treasury. The law requires the commission to certify to the Secretary of the Treasury "that the applicant, in the opinion of the commission, is unable to provide itself with the funds necessary for the aforesaid purposes from other sources." In some of the certificates issued, including the Illinois Central, Burlington, Santa Fe, Great Northern, etc., the commission added the words "except at excessive rates of interest." Because of this technicality, the Treasury held up the payments of the money and created considerable unpleasantness on all sides. A hearing was held by the commission and it decided on the basis of the arguments brought out at that time, that the inability referred to by the law meant a practical business inability. That is, it held that a railroad is in effect unable to borrow money elsewhere when in the commission's opinion the rate of interest elsewhere is excessive. It has since issued "clean" or unqualified certificates. Its decision in this matter, announced in November, said:

The provisions of the Transportation Act relating to the loan fund are as follows:

By section 5 of the Sundry Civil Appropriations Act, June 5, 1920, paragraphs (a), (b) and (c) of section 210 of the Transportation Act, 1920, were amended so as to read as follows:

"Sec. 210. (a) For the purpose of enabling carriers by railroad subject to the Interstate Commerce Act properly to serve the public during the transition period immediately following the termination of Federal control, any such carrier may, at any time after the passage of this Act, and before the expiration of two years after the termination of Federal control make application to the commission for a loan from the United States to meeet its maturing indebtedness, or to provide itself with equipment or other additions and betterments, setting forth the amount of the loan; the term for which it is desired; the purpose of the loan and the use to which it will be applied; the present and prospective ability of the applicant to repay the loan and meet the requirements of its obligations in that regard; the character and value of the security offered; and the extent to which the public convenience and necessity will be served. The application shall be accompanied by statements showing such facts in detail as the commission may require with respect to the physical situation, ownership, capitalization, indebtedness, contract obligations, operation, and earning power of the applicant, together with such other facts relating to the propriety and expediency of granting the loan applied for, and the ability of the applicant to make good the obligation as the commission may deem pertinent to the inquiry.

"(b) If the commission, after such hearing and investigation, with or without notice, as it may direct, finds that the making, in whole or in part, of the proposed loan by the United States, for one or more of the aforesaid purposes, is necessary to enable the applicant properly to meet the transportation needs of the public, and that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan the commission shall certify to the Secretary of the Treasury its findings of such facts; also the amount of the loan which is to be made; the time, not exceeding fifteen years from the making thereof, within which it is to be repaid; the terms and conditions of the loan, including the security to be given for repayment; that the prospective earning power of the applicant, together with the character and value of the security offered, furnish in the opinion of the Commission reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor and reasonable protection to the United States; and that the applicant, in the opinion of the Commission, is unable to provide itself with the funds necessary for the aforesaid purposes from other sources.

"(c) Upon receipt of such certificates from the commission the Secretary of the Treasury shall immediately, or as soon as practicable, make a loan of the amount recommended in such certificate out of any funds in the revolving fund provided for in this section and accept the security prescribed therefor by the commission. All such loans shall bear interest at the rate of 6 per centum per annum, payable semi-annually, to the Secretary of the Treasury, and to be placed to the credit of said revolving fund. The form of obligation to be entered into shall be prescribed by the Secretary of the Treasury, but the time, not exceeding fifteen years from the making thereof, within which such loan is to be repaid, the security which is to be taken therefor, and the terms and the conditions of the loan shall be in accordance with the findings and the certificate of the commission."

The loans for equipment authorized by section 210, Transportation Act, 1920, may be made to or through such organization, car trust or other agency as may be determined upon or approved or organized for the purpose by the commission as most appropriate in the public interest for the construction, and sale or lease of equipment to carriers, upon such general terms as to security and payment or lease as provided in this section or in subsections 11 and 13 of section 422 of the Transportation Act, 1920.

"(d) The Commission or the Secretary of the Treasury may call upon the Federal Reserve Board for advice and assistance with respect to any such application or loan.

"(e) There is hereby appropriated out of any moneys in the Treasury not otherwise appropriated the sum of $300,000,000, which shall be used as a revolving fund for the purpose of making the loans provided for in this section, and for paying the judgments, decrees, and awards referred to in subdivision (e) of section 206.

"(f) A carrier may issue evidences of indebtedness to the United States pursuant to this section without the authorization or approval of any authority, State or Federal, and without compliance with any requirement, State or Federal, as to notification."

Under a literal interpretation of the concluding clause of paragraph (b) of Section 210 of the Transportation Act, 1920, as amended, the majority of railroads would be unable to qualify for loans. The remainder of the railroads, while able to make the showing that they are unable to obtain funds from such sources, generally cannot make the further showing required by the statute that "the prospective earning power and character of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor and to meet its other obligations in connection with such loan." Under these conditions it would be practically impossible to make any loans, and Sections 210 of the Transportation Act, 1920, as amended, would be reduced to a nullity.

In order to give force and effect to the statute, the inability to obtain funds from other sources must be construed as an inability to secure funds upon such terms which the carrier with due regard for the public interest would be justified in accepting, and it must be held that an excessive rate of interest or other unduly burdensome or injurious conditions which the exercise of sound business discretion will not permit constitute inability, within the meaning of the statute, to obtain funds from other sources.

National Railway Service Corporation

Another of the interesting features in connection with the revolving fund is the provision reading: "The loans for equipment authorized by Section 210, Transportation Act, 1920, may be made to or through such organization, car trust or other agency as may be determined upon or approved or organized for the purpose by the commission as most appropriate in the public interest for the construction and sale or lease of equipment to carriers, upon such general terms as to security and payment of lease as provided in this section. . . . . "

This provision was not in Section 210 as originally drawn but was added afterwards when the difficulty was made apparent of financing the carriers' needs under the depressed financial conditions at that time. It was suggested by the National Association of Owners of Railway Securities which has since formed the National Railway Service Corporation for the purposes named. The American Short Line Railroad Association has formed a similar organization known as the Consolidated Railway Equipment Corporation.

The National Railway Service Corporation proposes to finance the purchase of equipment on the basis of 40 per cent from the loan fund and 60 per cent from the large insurance and banking institutions associated with the parent association. It will issue two series of equipment obligations, aggregating $60,000,000 and maturing in 15 years. Equipment is furnished under one of two plans—one the conditional sale basis, the other the lease basis. Ten roads are in negotiation with it and in the case of the Baltimore & Ohio the commission approved a loan of $5,200,000 to the corporation for the account of the carrier.

Results to Date

The Interstate Commerce Commission in the annual report issued in the early part of December said that it had received 140 formal applications for loans, of which 36 had been approved in whole or in part. Thirty-one had been withdrawn and two denied.

Up to that time the total amount of loans approved was $115,767,710, divided as follows:

To meet maturing indebtedness	$57,790,750
To aid in the acquisition of locomotives and cars	28,698,745
To aid in the making of other additions and betterments	29,278,215
	$115,767,710

In the following are shown the loans thus far reported as approved:

Ann Arbor	$35,000
	250,000
Aransas Harbor Terminal	135,000
Atchison, Topeka & Santa Fe	5,493,600
Atlanta, Birmingham & Atlantic	200,000
Baltimore & Ohio	3,000,000
	5,200,000
Bangor & Aroostook	200,000
Boston & Maine	5,000,000
	6,696,479
Carolina, Clinchfield & Ohio	2,000,000
	1,000,000
Central New England	300,000
Central of Georgia	815,000
Chesapeake & Ohio	3,759,000
Chicago & Western Indiana	8,000,000
Chicago, Burlington & Quincy	4,446,525
Chicago Great Western	997,830
	240,000
Chicago, Indianapolis & Louisville	200,000
Chicago, Rock Island & Pacific	2,000,000
	7,862,000
Delaware & Hudson	1,125,000
Erie	8,000,000
	1,840,700
Fort Smith & Western	156,000
Fredericksburg & Northern	20,000
Great Northern	17,910,000
Gulf, Mobile & Northern	515,000
Hocking Valley	1,665,000
Illinois Central	4,511,750
Kansas City, Mexico & Orient	2,500,000
Long Island	718,000
Maine Central	1,653,000
Missouri Pacific	8,671,760
New York Central	26,775,000
New York, New Haven & Hartford	9,630,000
Northern Pacific	6,000,000
Pennsylvania	6,780,125
Rutland	61,000
Salt Lake & Utah	64,000
	235,400
Shearwood	29,000
Seaboard Air Line	6,073,400
Term. R. R. Assn. of St. Louis	898,925
Texas & Pacific	3,000,000
Virginian	2,000,000
Western Maryland	1,372,800
Wheeling & Lake Erie	2,460,000
Wisconsin, Brunswick & Southern	90,000
	$172,586,294

The loans certified are being delayed somewhat by the Treasury Department. On October 20, the loans actually made totaled $56,190,325. There is a good deal of red tape to go through in fixing up the security the road is to offer, etc. The treasury has only a small force working on the matter, so that it is considerably behind the commission's certifications. The loans actually made to date are approximately $130,000,000.

Details by Roads

In the remainder of this article there are given the details concerning each road which has been granted a loan from the $300,000,000 loan fund, as well as the status of the larger part of those applications which are now before the commission. The list is given by roads and is explained as follows:

The word *Recommended* refers to the recommendations given in the report of the special committee on the loan fund of the Association of Railway Executives. The sums recommended are divided into their respective classes and are given at the end in totals. In case action on the application is not noted, as many details concerning the use to which the money is to be put are given as are available. These details are available in all cases for way and structures from the committee's report and are shown in parentheses.

The word *Loaned* refers to the commission's action. In each case details are given as to the commission's findings, the use to which the money is to be put, the additional financing that is to be done by the carrier and other information, insofar as this information is readily available or as space will permit.

The sum given under the *Recommended* head is not necessarily comparable with the sum finally granted by the commission. In many cases the applications were amended and in some cases additional applications were filed which were not reported.

The details follow:

Ann Arbor

Recommended: $275,000 for way and structures.

Loaned: $35,000 to aid in purchase of 3 switching locomotives; estimated cost $116,000, of which 30 per cent is from loan, 50 per cent in equipment notes, 30 per cent cash.

Loaned, also: $250,000 for way and structures. Estimated cost $500,000, 50 per cent from loan. Includes improvements of and additions to facilities at Toledo, costing $400,000 to enable Pennsylvania Railroad to operate through Ann Arbor terminals to connection with Pere Marquette at Alexis, Ohio, making a through Detroit line.

Aransas Harbor Terminal

Loaned: $135,000 to aid carrier to reconstruct and improve line from Aransas Pass, Tex., to Gulf of Mexico at Port Aransas, Tex., damaged by hurricane. Required that $275,000 be supplied by security holders or communities interested, and that government loan be used for capital expenditures only.

Atchison, Topeka & Santa Fe

Recommended: $2,149,450 for locomotives, $7,850,550 for freight cars; total $10,000,000.

Loaned: $5,493,600 to aid in purchase of 2,500 refrigerator cars; estimated cost $11,875,000: 500 gondola cars, $1,501,500, and 50 locomotives, $4,298,900; total $17,675,400, of which carrier to supply $12,181,800.

Atlanta, Birmingham & Atlantic

Recommended: $200,000 for maturities.

Loaned: $200,000 to aid in meeting maturity of $475,000 due July 19, 1920. Required that carrier finance remaining $275,000 at 7 per cent, which carrier complied with.

Baltimore & Ohio

Recommended: $2,087,000 for existing equipment and $5,000,000 for way and structures (additional main tracks, yard tracks, sidings, interlockers, telephone train despatching, shop machinery, bridges, trestles, culverts, heavier rail); total $7,087,000.

Loaned: $3,000,000 for way and structures.

Loaned, also: $5,200,000 to National Railway Service Corporation for account of Baltimore & Ohio for freight-train equipment at a total estimated cost of $14,233,000, of which railway to supply about $9,000,000. The National Railway Service Corporation has been approved by the commission as an agency through which loans to carriers for equipment will be made, under special authority conferred upon the commission by the Transportation Act.

Bangor & Aroostook

Recommended: $20,000 for way and structures and $180,000 for locomotives; total $200,000.

Loaned: $200,000. Of this $180,000 is to aid in purchase of 6 locomotives; estimated cost $360,000, of which carrier is to supply 50 per cent. Remaining $20,000 for shop machinery and tools, a coal storage plant and passing tracks. Carrier also to supply $58,000 for other necessary additions and betterments.

Boston & Maine

Recommended: $1,036,490 for existing equipment; $2,188,564 for way and structures (retaining walls and rip rapping, renewal of bridges, automatic signals, extension to sidings, interlockers, improved water supply, engine house and yard facilities); also $1,814,047 for way and structures (extension of yard tracks, roundhouse and engine terminal facilities); $1,245,000 for locomotives; total $6,284,101.

Loaned: $5,000,000 to cover maturities of $8,843,000 in 1920 on condition that road finance the refunding of the remainder of this indebtedness.

Loaned, also: $6,696,479 to aid in purchase of locomotives and to assist in additions and betterments to existing equipment and way and structures at estimated total cost of $7,869,000. Carrier required to finance about $1,212,000.

Buffalo, Rochester & Pittsburgh

Recommended: $496,750 for maturities.

Carolina, Clinchfield & Ohio

Recommended: $2,000,000 for maturities.

Loaned: $2,000,000 for maturities. Required that carrier before receiving loan should effectively finance the other obligations by sale of not less than $5,000,000 income debentures or at more than 6 per cent and to be sold or exchanged at not less than par without other cost to carrier Requirement complied with.

Loaned, also: $1,000,000 for maturities.

Central New England

Recommended: $300,000 for way and structures.

Loaned: $300,000 for additions and betterments to way and structures at cost of $500,000, of which company required to finance $200,000.

Central of Georgia

Recommended: $237,500 for locomotives and $577,500 for freight cars; total, $815,000.

Loaned: $815,000 to assist in purchase of 100 stock, 500 box and 200 gondola cars and 7 Mountain type locomotives; estimated cost $2,785,000, of which carrier required to finance $1,970,000.

Chesapeake & Ohio

Recommended: $4,750,000 for way and structures, $1,058,750 for locomotives and $1,658,750 for freight cars; total, $7,467,500. Recommendation of $4,750,000 for way and structures contingent upon carrier supplying $2,500,000 additional; for double-tracking, grade reduction and other work necessary to extend operation of Mallet locomotives and large capacity coal cars.

Loaned: $3,759,000 to aid in purchase of 25 locomotives and 1,000 100-ton freight cars, total cost about $8,119,000, of which carrier to finance $4,360,000.

Chicago & Alton

Recommended: $359,400 for existing equipment and $134,000 for locomotives; total, $493,400.

Chicago & Eastern Illinois

Recommended: $385,940 for existing equipment and $502,060 for way and structures (shop machinery and improvements to trestles); total, $888,000.

Chicago & Western Indiana

Recommended: $1,805,000 for way and structures.

Loaned: $8,000,000. Of which $6,000,000 to aid carrier in meeting collateral trust notes due by extension, September 1, 1920; carrier required to finance on basis satisfactory to I. C. C. remaining $8,000,000 of its maturing obligations. Remaining $2,000,000 of loan for additions and betterments. These included improvements at power house at 48th street, Chicago, $165,000; installation of block signals between 15th and 81st streets, $191,000; completion of elevated yard along Canal street between 23rd and 29th streets, $933,000; and construction of new yard in vicinity of Chicago Drainage Canal for Belt Railway of Chicago, $300,000.

Chicago, Burlington and Quincy

Recommended: $1,472,775 for locomotives and $2,973,750 for freight cars; total, $4,446,525.

Loaned: $4,446,525 to assist in purchase of 45 locomotives, 500 stock cars, 1,000 refrigerator cars, 1,000 box cars and 1,000 gondola cars; estimated total cost of $14,840,550, of which carrier finances $10,394,025.

Chicago Great Western

Recommended: $872,660 and $270,000 for existing equipment: $150,500 for way and structures and $276,000 for locomotives; total, $1,569,160.

Loaned: $997,830 to aid in purchase of 10 heavy locomotives costing $552,000; to assist carrier in reconstructing 697 box, 200 hopper and 75 refrigerator cars at estimated total cost of $1,142,660 and for additions and betterments to way and structures, $301,000. Carrier contributes $997,830. Item of $301,000 includes installation of additional yard tracks at Olewein, to cost $120,000, installation of additional roundhouse equipment at Olewein and larger turntables at Chicago and Des Moines, $181,000.

Loaned, also, in December: $240,000 to enable carrier to meet interest on bonds of Mason City & Fort Dodge, a subsidiary line.

Chicago, Indianapolis & Louisville

Recommended: $200,000 for way and structures and $300,000 for cars; total, $500,000.

Loaned: $200,000 to enable carrier to construct modern steel car repair shop at LaFayette, Ind.

Chicago Junction

Recommended: $1,100,000 for way and structures (yards and car shop).

Chicago, Milwaukee & St. Paul

Recommended: $4,940,000 for way and structures (ballast, rail, bridges, yard tracks and sidings, fuel stations, water stations, shop buildings, shop machinery and tools, track elevation) and $3,150,000 for freight cars; total, $8,090,000.

Chicago, Rock Island & Pacific

Recommended: $1,257,000 for existing equipment; $5,000,000 for way and structures (additional yard tracks and sidings, shop machinery and tools, ballast, bank widening, rails, bridges); $879,583 for locomotives and $509,667 for freight cars; total, $7,646,250.

Loaned: $2,000,000 to assist in meeting maturities, carrier required to finance in same connection, $6,000,000.

Loaned, also: $7,862,000, including $1,425,000 for additions and betterments to existing equipment and $6,437,000 for additions and betterments other than to equipment.

Cincinnati, Indianapolis & Western

Recommended: $33,500 for way and structures (shop machine tools).

Delaware & Hudson

Recommended: $2,250,000 for way and structures.

Loaned: $1,125,000. Carrier to supply $1,125,000, making a total of $2,250,000 to be used for elimination of Whitehall tunnel at cost of $500,000, for a new yard at Glenville, $1,250,000 and one at Port Henry, $500,000.

Electric Short Line

Application for loan for $42,250 for equipment and additions and betterments denied, on ground that its prospective earning power being doubtful the security offered is inadequate.

Erie

Recommended: $168,532 for existing equipment; $1,496,897 for way and structures, $1,242,500 for locomotives, $250,000 for freight cars and $5,879,125 for maturities.

Loaned: $8,000,000 to assist carrier to finance 1920 maturities, aggregating $23,516,500; also to enter into contracts with holders of these bonds issued by its predecessor companies, extending maturity dates 10 years. Company expected to finance on terms and conditions prescribed by I. C. C. remainder of its 1920 maturities, aggregating $15,516,500.

Loaned, also: $1,840,700 to aid in reconstructing freight equipment and in making improvements to existing equipment and for additions and betterments to way and structures. Total estimated cost $6,680,000, of which carrier to finance $4,840,000.

Evansville, Indianapolis & Terre Haute

Recommended: $400,000 for way and structures (bridges, rails, ties and ballast).

Fort Smith & Western

Recommended: $215,000 for way and structures (side tracks, yard tracks and ballast) and $75,000 for locomotives; total, $290,000.

Loaned: $156,000 for purchase of equipment; for additions and betterments to existing equipment and way and structures; total cost estimated $425,356, of which carrier to finance about $270,000.

Fredericksburg & Northern

Loaned: $20,000 for 3 years to aid in purchase of one second hand locomotive.

Fruit Growers' Express

Recommended: $6,750,000 for freight cars.

Great Northern

Recommended: $1,550,000 for way and structures; $1,375,000 for locomotives; $637,500 for freight cars and $15,000,000 for maturities; total, $18,562,500.

Loaned: $17,910,000, including $15,000,000 to assist carrier in meeting maturities; $2,010,000 to aid purchase of freight cars and locomotives and $900,000 for way and structures.

Gulf Coast Lines

Recommended: $30,500 for existing equipment; $200,000 for way and structures (yards and sidings, shops, shop machinery, heavier rail); $150,000 for locomotives and $667,063 for freight cars; total, $1,047,563.

Gulf Mobile & Northern

Recommended: $256,050 for existing equipment, $145,000 for way and structures (interlockers, heavy rail ballasting) and $113,700 for locomotives; total, $514,750.

Loaned: $515,000 to aid in purchase of 6 locomotives at cost of $227,400 and for additions and betterments to existing equipment and to way and structures at cost of $401,500. Carrier required to finance $114,000.

Locomotives and freight cars to be purchased include 45 heavy Mikado locomotives and 1,000 75-ton ore cars. Total cost $5,300,000, of which carrier to finance $3,290,000.

Expenditures for additions and betterments to total $1,800,000, of which carrier to finance $900,000. For strengthening existing equipment, $200,000; for fencing right of way, $100,000; for cottages for housing employees at White Fish, Mont., $100,000; for car repair sheds in North Dakota, $400,000; for additional yard tracks at Allouez, Wis.; Hillyard, Wash., and other miscellaneous passing and station tracks, $600,000; for additional or improved water supply at Devon, Mont., and miscellaneous use, $100,000; for shop buildings and tools at Whitefish, Mont., engine terminal and elsewhere, $300,000.

The item of $15,000,000 for maturities is to enable carrier to meet in part maturing collateral trust notes due September 1, 1920, aggregating $20,000,000. This part of loan to be repaid not later than September 1, 1921, when amount of repayment will be available by the government to meet demands of other carriers for loans before the expiration of period provided by law for disbursement of revolving fund. Carrier also required to pledge itself to apply to I. C. C. for loan to construct or build 500 refrigerator cars, 25 per cent of cost of which will be financed by loan and 75 per cent by carrier.

Gulf Ports Terminal

Applied for loan of $500,000 to enable resumption of construction of 26 miles of unfinished line between Pensacola and Mobile on which roadbed finished for 18 miles and also for the betterment of 46 miles of road now in operation and the purchase of some additional equipment.

Loan denied and new application for $300,000 also denied on ground that applicant not a common carrier, that it did not show loan necessary to enable applicant properly to meet the transportation needs of the public and that security offered not sufficient.

Hocking Valley

Recommended: $159,471 for existing equipment and $1,352,958 for way and structures (additional main tracks, yard tracks, sidings, shops); total, $1,512,429.

Loaned: $1,665,000.

Illinois Central

Recommended: $2,987,500 for locomotives and $1,524,250 for freight cars; total, $4,511,750.

Loaned: $4,511,750 to aid in purchase of 75 locomotives, 1,000 refrigerator cars, 200 flat cars, 200 stock cars and 52 caboose cars; total cost $12,072,000, of which carrier to finance $7,560,300.

International & Great Northern

Recommended: $40,000 for way and structures (for 90-lb. rail), $312,500 for locomotives and $750,000 for freight cars; total, $1,102,500.

Kansas City, Mexico & Orient

Loaned to receiver $2,500,000 to aid in meeting maturing indebtedness, consisting of receiver's certificates due December 1, 1920. Loan covers full amount of applicant's maturities and was approved after conclusive showing that operation of carrier would have had to be suspended unless the aid of a loan were given.

Long Island

Recommended: $500,000 for way and structures (additional yards, yard tracks, storage yards and interchange tracks) and $218,500 for locomotives; total $718,500.

Loaned: $718,000 to aid in purchase of 4 switching and 6 ten-wheel locomotives at cost of $437,000 and in making additions and betterments to way and structures costing $500,000. Carrier required to finance $218,000 of cost of equipment.

Louisiana & Arkansas

Recommended: $162,574 for way and structure (additional yard tracks, sion, tie plates, yard and passing tracks, heavier rail).

Louisville & Jeffersonville Bridge

Recommended: $162,574 for way and structures (additional yard tracks, coal station, water station, ash pit, heavier rail and bin).

Maine Central

Recommended: $65,900 for existing equipment and $533,132 for way and structures (heavier rails, ballast, shops, shop machinery and renewal of bridges); total, $599,032.

Loaned: $653,000 to aid in purchase of 10 locomotives, 6 caboose cars and work equipment; estimated cost $534,780, and in making additions and betterments at total cost $783,132. Carrier required to finance $665,706.

Loaned also: $1,000,000.

Minneapolis & St. Louis

Recommended: $546,500 for way and structures (additional main tracks, yard tracks, sidings, engine terminal facilities, shops, shop machinery, ballast); $487,500 for locomotives and $1,240,000 for freight cars; total, $2,274,000.

Missouri, Kansas & Texas

Recommended: $1,050,000 for locomotives and $300,923 for freight cars; total, $1,350,923.

Missouri Pacific

Recommended: $2,843,179 for structures (rails, bridges, trestles, additional yard tracks, signals and interlockers, telegraph and telephone lines, fuel and water stations, shop buildings, engine houses, shop machinery, tools, wharves and docks) $97,250 for locomotives and $1,454,000 for materials; total, $4,394,429.

Loaned: $8,671,760 for purposes noted.

New York Central Lines

Recommended: $2,406,842 for existing equipment; $12,101,928 for structures; $2,925,875 for locomotives; $10,107,950 for freight cars; total, $27,542,595.

Loaned: $26,775,000 to aid New York Central and subsidiary lines to provide themselves with new equipment and additions and betterments to existing equipment and to way and structures at total estimated cost of $56,625,000. Carriers required to finance about $30,000,000. Total proposed expenditure of $56,625,000 includes $39,800,000 for new equipment, of which $29,850,000 to be financed by company and $9,950,000 from loan; also, $5,287,000 of additions and betterments to existing equipment to be financed from loan, and $11,538,000 of additions and betterments to way and structures to be financed by loan. New York Central and subsidiaries have themselves financed by sale of securities since termination of federal control $63,625,000 for refunding and other necessary corporate purposes.

Expenditures of $39,800,000 for equipment mentioned include 250 refrigerators, 1,500 50-ton all-steel box, 2,500 50-ton all-steel automobile, 4,000 55-ton hopper, 694 single deck stock and 300 double deck stock cars; total cost $29,084,315, of which $21,812,736 to be financed by carriers and $7,271,579 from loan. Also 66 eight-wheel switching, 40 Pacific, 10 light Mallet, 3 heavy Mallet and 60 heavy Mikado locomotives at total cost of $10,715,685, of which $8,037,264 to be financed by carriers and $2,678,421 from loan.

The details by the lines of the New York Central system follow.

New York Central (Inc. Boston & Albany)

$4,490,000 to aid in purchase of equipment; estimated cost $17,960,000, of which carrier is to finance $13,470,000. Includes 1,000 50-ton all-steel box; 1,000 50-ton all-steel automobile; 1,500 52-ton hopper; 494 single deck stock and 200 double deck stock cars; 50 eight wheel switching; 20 Pacific, 10 light Mallet and 3 heavy Mallet locomotives.

$2,486,000 for additions and betterments to existing equipment, all financed from loan.

$5,500,000 for additions to way and structures, all financed from loan, including engine terminals and facilities, freight yards and freight facilities siding and extensions, interlockers, shop machinery and miscellaneous betterments.

Michigan Central

$2,045,000 to aid in purchase of equipment; estimated cost $8,180,000, of which carrier to finance $6,135,000. Includes 1,000 50-ton all-steel box; 500 50-ton all-steel automobile; 100 single deck stock; 100 double deck stock and 250 refrigerator cars, and 6 eight-wheel switching and 10 Pacific locomotives.

$1,885,000 for additions and betterments to existing equipment, all financed from loan.

$613,000 for additions and betterments to way and structures all financed from loan. Includes passing tracks, repair tracks, storage tracks, yard tracks and engine terminals.

Cleveland, Cincinnati, Chicago & St. Louis

$3,415,000 to aid in purchase of equipment, estimated total cost $13,660,000, of which carrier to finance $10,245,000. Includes 500 50-ton all-steel box; 500 50-ton all-steel automobile; 2,000 55-ton hopper and 100 single deck stock cars and 10 eight-wheel switching, 10 Pacific and 50 heavy Mikado locomotives.

$529,000 for additions and betterments to existing equipment, all financed from loan.

$4,560,000 for additions and betterments to way and structures, all financed from loan. Included double tracking, passing and storage track, shop tools, machinery and signals.

Cincinnati Northern

$21,000 for additions and betterments to existing equipment, all financed from loan.

$92,000 for additions and betterments to way and structures, all financed from loan. Includes passing tracks, interlockers, and tools.

Toledo & Ohio Central

$214,000 for additions and betterments to way and structures, all financed from loan. Includes yard tracks, passing tracks, yard facilities, shop tools and machinery.

Zanesville & Western

$60,000 for additions and betterments to way and structures, all financed from loan. Includes engine terminals and yard tracks.

Lake Erie & Western

$366,000 for additions and betterments to existing equipment, all financed from loan.

$243,000 for additions and betterments to way and structures, all financed from loan. Includes passing track, interlockers, shop machinery and tools, engine house stalls.

Kanawha & Michigan

$256,000 for additions and betterments to way and structures, all financed from loan. Includes passing tracks and sidings.

New York, New Haven & Hartford

Recommended: $8,130,000 for way and structures (development of freight yards, engine terminals, shops, tools, automatic signals) $1,750,000 for locomotives; total $9,880,000.

Loaned: $9,630,000 to aid in purchase of new equipment and in additions and betterments to way and structure at total estimated cost of $13,525,000.

Norfolk Southern

Recommended: $78,000 for existing equipment; $200,000 for way and structures (flattening curves, reducing grades and strengthening bridges, so as to materially increase train haul of engines).

Northern Pacific

Recommended: $2,400,000 for way and structures, $1,853,978 for locomotives and $1,746,022 for freight cars.

Loaned: $6,000,000 including $3,600,000 to aid in purchase of equipment and $2,400,000 for additions and betterments to way and structures, total estimated cost $16,000,000, of which carrier is to finance $10,000,000.

Equipment to be purchased includes 6 Mallet, 20 Pacific, 25 Mikado and 24 switching locomotives; 300 Hart convertible, 60 air dump and 1,000 steel underframe box; betterments to equipment, $300,000, making total of $9,690,208.

Proposed expenditures for additions and betterments to way and structures include: $362,000 for widening cuts and fills; $407,454 for ballast; $1,103,400 for rail and other track material; $556,557 for bridges, trestles and culverts; $473,787 for grade crossings and crossing signals; $558,600 for additional main track; $334,750 for additional yard tracks, sidings and industrial tracks; $104,679 for signals and interlocking; $109,122 for telephone and telegraph lines; $56,685 for tunnel and subway improvements, $222,168 for freight and freight and passenger stations, office buildings, etc.; $105,456 for water stations and appliances; $104,038 for fuel stations and appliances; $644,121 for shop buildings, engine houses and appliances; $475,542 for shop machinery and tools; $37,327 for electric power plants, etc.; $506,000 for pile drivers, cranes, etc.; $201,000 for car sleds; total $6,368,905.

Pennsylvania Railroad

Recommended: $6,780,125 for way and structures (grain elevator, engine house facilities, yard tracks, shops).

Loaned: $6,780,125 for purposes mentioned.

Philadelphia & Reading

Recommended: $1,088,125 for locomotives.

Rutland

Recommended: $61,198 for way and structures (bridges, rebuilding swinging bridge at Fort Ticonderoga).

Loaned: $61,000 to aid in making additions and betterments to way and structures; total estimated cost $89,000; of which carrier is to finance $28,000.

Salt Lake & Utah

Loaned: $64,000 to aid in purchase of new equipment; loaned also $235,400 to assist in making other additions and betterments and in financing pressing maturities carrier has undertaken to finance for new equipment $213,563 for other additions and betterments, $78,600 and for maturities, $43,336.

Shearwood Railway

Loaned: $29,000 to enable carrier to meet maturing indebtedness and to provide additions and betterments.

Seaboard Air Line

Recommended: $750,000 for way and structures and $2,291,000 for maturities.

Loaned: $6,073,400 to aid in inquiring refrigerator cars at cost of $1,058,000 in making additions and betterments at total cost of $750,000 and in meeting 1920 maturities, aggregating $8,248,000. Carrier required to finance $3,982,600. Additions and betterments include ballasting, rail renewals, bridging, shop machinery and facilities, cinder pit and fuel facilities and additional industry tracks.

Southern Pacific

Recommended: $1,397,500 for locomotives and $6,102,500 for freight cars; total $7,500,000.

Application denied on ground that the showing made in respect to inability of company to secure necessary funds from other sources, unconvincing. I. C. C. said that only money borrowed by applicant since termination of federal control was $15,000,000 by the sale of equipment trust certificates, which was characterized as "relatively unimportant, considering the value of the applicant's property, its available assets and its prospective earning power." Carrier had proposed to use loan to assist in purchase of cars and locomotives costing $17,232,600, of which $12,204,600 was to be financed by company.

Tampa Northern

Recommended: $57,000 for way and structures (heavier rails and additional tracks) and $100,000 for maturities; total $157,000.

Terminal Association of St. Louis

Loaned: $898,925 to aid in meeting demand notes and in making additions and betterments. Amount for maturing obligations $377,750, total amount of such obligations $1,511,000; carrier required to finance for period not less than one year at not more than 7 per cent, the remainder of maturities, $1,133,250. Amount for additions and betterments, $519,175; carrier itself to finance usual amount; includes improvements to Eads bridge costing $129,000; a new yard at cost of $44,900; completion of upper Wiggins yard, $170,000; a viaduct, $35,000; equipment for car repair shop $2,300; additional trackage, $109,250 and extension to Brooklyn shops, $494,700.

Texas & Pacific

Recommended: $1,091,000 for existing equipment; $1,688,000 for way and structures (new yard and engine facilities additional passing tracks, shop machinery, train, despatching circuits, water supply); total $2,779,000.

Loaned: $3,000,000.

Toledo, St. Louis & Western

Recommended: $510,000 for way and structures (yard tracks, storage tracks, new roundhouse, heavier rail and ballast), $375,000 for locomotives; total $885,000.

Trans-Mississippi Terminal

Recommended: $750,000 for maturities.

Virginian

Recommended: $2,000,000 for way and structures (completion of double track on ruling grade)

Loaned: $2,000,000 to aid company in extending its facilities to handle adequately its rapidly expanding traffic; carrier has itself financed large expenditures for equipment and other additions and betterments.

Wabash

Recommended: $200,000 for existing equipment; $977,200 for way and structures (enlargement of shops, shop tools, heavier rail); also $191,225 for way and structures (strengthening of bridges for heavier power), $162,500 for locomotives; total $1,530,925.

Western Maryland

Recommended: $622,800 for way and structures and $750,000 for locomotives; total $1,372,800.

Loaned: $1,372,800 to aid in purchasing 20 freight locomotives at cost of $1,500,000 in making additions and betterments to way and structures at total cost of $622,800; carrier required to finance $750,000 one-half of cost of locomotives. Has already financed purchase ten modern car floats at cost of $500,000. Additions and betterments to way and structures at total cost of $622,800 include passing sidings, $27,800; engine terminal and yards at Bowest, Pa., $100,000; dredging at Port Covington, Baltimore, $95,000 and enlargement and extension of coal pier at Baltimore $400,000.

Loaned, also: $1,050,000.

Wheeling & Lake Erie

Recommended: $1,461,540 for way and structures (additional freight yards, engine terminals and repair shops), $3,600,000 for freight cars.

Loaned: $2,460,000 to aid in meeting 1920 short term maturities and in making additions and betterments to way and structures. Carrier required to finance on account of 1920 short term maturities, $1,200,000.

Wisconsin, Brunswick & Southern

Loaned: $90,000 to aid in meeting maturing indebtedness and proving additions and betterments to way and structures at total estimated cost of $125,000. Carrier required to finance about $35,500.

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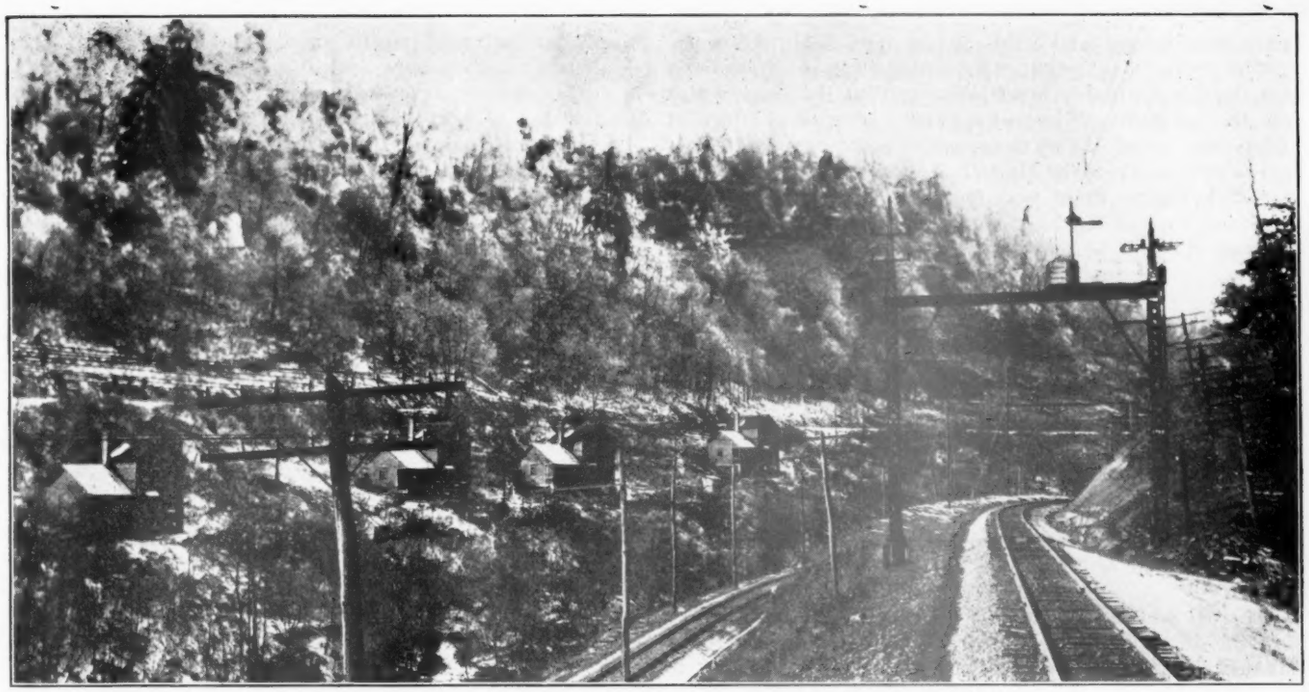
Railway Station at Lucerne, Switzerland, As Seen From the Air



About a Mile East of the Elkhorn Tunnel on the Norfolk & Western

The Electrification of Steam Railroads

A Brief Survey of Operating Results on the Norfolk & Western and the C. M. & St. P.

THE PART that electrification will play in solving the traffic problem of the future is problematical. A large increase of traffic is inevitable and means must be provided for handling it. The extent to which electric operation will be adopted in the near future will be influenced materially by the success of the operation on those roads which are already electrified.

Comparatively little can be gained by a study of operating results of electrified roads in foreign countries because conditions are very different from those in the United States. In this country interest has been centered on the Norfolk & Western and the Chicago, Milwaukee & St. Paul. Tunnels on these two roads did restrict steam operation, but operation on neither road was circumscribed by tunnel and terminal requirements. Each new application of electric operation presents an individual problem, but many difficulties common to all roads have been and are being worked out on the two roads mentioned. The purpose of this article will be briefly to survey the operating results so far as data concerning them are available in a usable form.

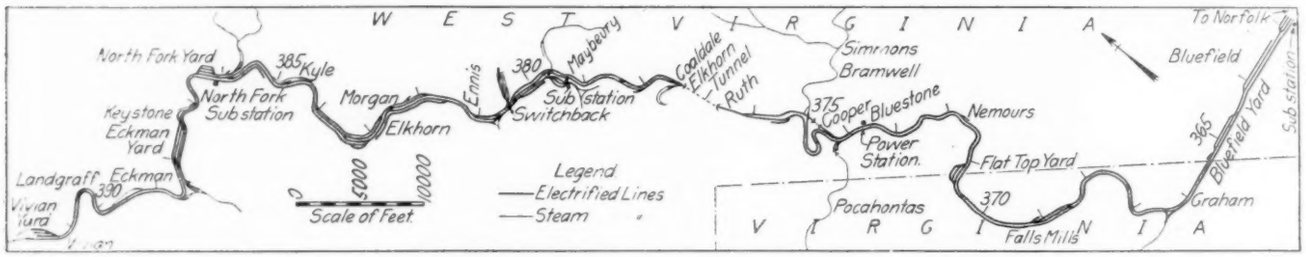
OPERATING PROBLEMS common to a large number of railroads with heavy grades and tunnels have been worked out on the Norfolk & Western and the Chicago, Milwaukee & St. Paul with the aid of electric operation. The operating conditions on the two roads are very different, in that one may be likened to a big yard with very heavy switching operations, while the other is a long section of single track road on which the length of locomotive divisions has been doubled.

When electric operation on the Norfolk & Western is studied, the proper consideration should be given to a certain few fundamental facts. For example, locomotive maintenance costs have been high but it is logical that they should have been under the circumstances. The locomotives were put into a service heavier than anything which had been done before or has been done since; moreover, there was no precedent to follow in designing equipment for such service. Furthermore, the maintenance of any machine is to a large extent dependent upon the amount of work done by the machine, and the work done per mile and per day is greater for the Norfolk & Western locomotives than for any other locomotives, steam or electric. For example, about 60 per cent as much power is used by 12 locomotives operating over 28 miles of line on the Norfolk & Western as is used by 42 locomotives operating over 440 miles of line on the St. Paul. The power consumption on the Norfolk & Western during 1919 was 67,395,000 kw. hr., while that on the St. Paul was about 120,500,000 kw. hr. During 1918 the Norfolk & Western electric locomotives used 74,325,992 kw. hr., while the St. Paul used about 130,177,000.

In spite of many difficulties the electric system has been made to give excellent results and operating men agree that it has been the only practical solution for the division's problem.

The function of the electrified section is that of collecting

from mine sidings and yards in the coal fields the entire eastbound coal tonnage and transporting it up the grades and over the summit to the classification yard at Bluefield, which is a division point. The coal is partly classified at Bluefield and is then moved east by steam power to the various destination points, chiefly to the Norfolk & Western marine shipping pier at Lamberts Point near Norfolk, Va. All coal traffic originates west of the Flat Top yard, about 6 miles east of the summit of the heavy grade, and although a large amount



Map of Electrified Section, Norfolk & Western. Fully 60 Per Cent. of the Line Is on Curves

of the coal which originates on the electrified division goes west, the shipments to the east constitute the bulk of the traffic handled electrically. Some coal originating east of the summit is shipped to the west, and this is also handled by electric service to yards near the western end of the electrified section. There is probably more Norfolk & Western coal shipped to the west than to the east, but over the electrified section the total eastbound tonnage is now about six times as great as the westbound. About 80 per cent of the eastbound traffic originates between Eckman and Coaldale.

Steam road locomotives are still used over the electrified section for through merchandise freight and for passenger trains, but electric locomotives are used regularly as helpers on three eastbound passenger trains and for most of the through freight trains. An electric helper is also occasionally used to help other delayed passenger trains to make up time. The principal duty of the electric locomotives, however, is to make-up and haul extra, eastbound coal trains over the electrified division into Bluefield.

Reason for Electrifying

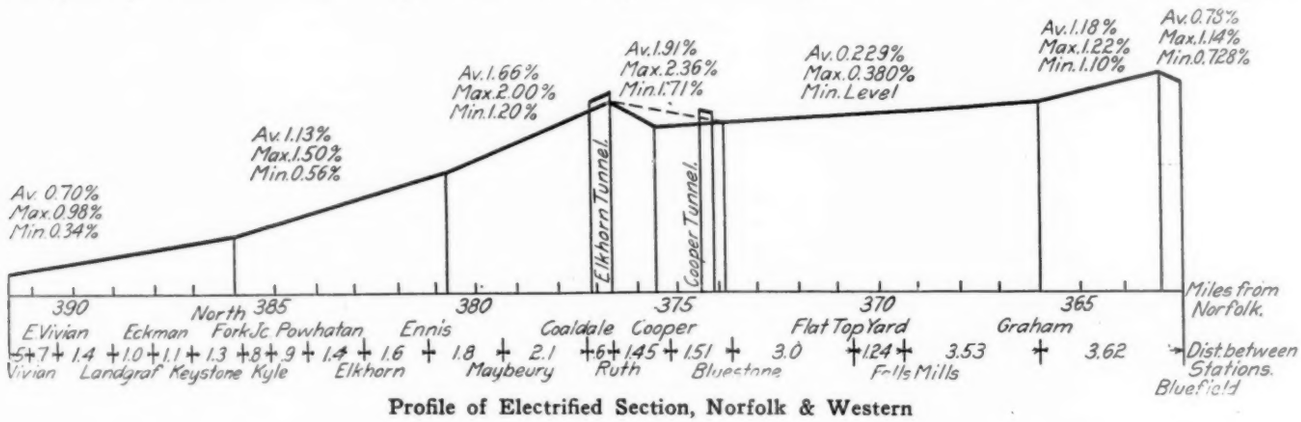
Decision to electrify the Elkhorn grade was made because this section of the road restricted the amount of main line traffic that could be handled. The increasing traffic, together with the heavy grades and added tunnel complications, had made it practically impossible to handle the traffic over this section with steam power. Because of the mountainous country through which the division runs it was not economically practicable to build more tracks and the only solution lay in handling heavier trains at higher speeds.

Two electric locomotives now haul a 3,250-ton train up the 2 per cent grade at 14 m. p. h. where originally three Mallet locomotives were used at a speed of about 7½ m. p. h. The effect of increased speed is especially marked at the single track Elkhorn tunnel, which is over 3,000 ft. long on a 1.5 per cent grade. Because of ventilation requirements, under steam operation, it was necessary to reduce the speed up the grade to about 6 m. p. h., requiring about seven minutes to clear the block. With electric operation this movement is made in about three minutes. Since electric operation was installed the Elkhorn grade has not caused restriction of main line traffic.

Train Operation

Several different methods of operation have been tried during the past five years. All trains do not do the same work, but following a locomotive and train crew through a typical day's work will give an idea of how the coal trains are handled.

A train of westbound empties, consisting of from 90 to 110 cars, is made up by a steam switcher in the Bluefield yards. The electric crew take the locomotive to the caboose track where they pick out their caboose and couple it on the rear of the train. The locomotive then goes to the head end of the train and proceeds out. The train is run at both the 14 and 28 m. p. h. speeds from Bluefield through the Elkhorn tunnel.



Profile of Electrified Section, Norfolk & Western

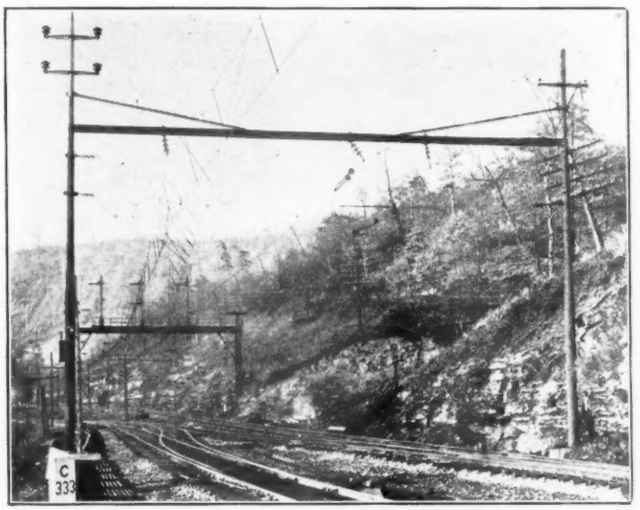
The train then drops down the heavier grade, regenerating power to the line. The empties are set off at various sidings on the way down the hill. When the last of the empties are to be set off, the caboose is uncoupled on the main line and is allowed to roll down the hill until it meets the locomotive as it comes out of the lower end of the siding. They then proceed to the Eckman yards. Had they taken westbound tonnage from Bluefield they would probably have proceeded to Vivian.

At Eckman all or a part of a 3,250-ton train is made up and taken up the grade to the Elkhorn tunnel with the aid of a pusher. If only a part of a full tonnage train is taken east from the Eckman yards the balance will be picked up at other points on the way to the summit.

The method of starting such a train is particularly interesting. When the engineer on the front end is ready to start he backs the train against the pusher. At this signal the engineer on the pusher applies power forward and holds with full load current on the motors until the front end locomotive has taken its share of the load. The pusher then starts forward automatically.

A special hook is used for uncoupling the pusher at the top of the grade, allowing it to go back for another train. The head-end locomotive then regenerates power down the steep grade east of Elkhorn tunnel. With a full tonnage train the one locomotive returns practically full load current to the line.

The train then proceeds to Flat Top yard where the pro-



Typical Overhead Construction on the Norfolk & Western

cedure depends on whether the crew is making its first or second trip for the day. In the former case, it is usual for the train to be left at Flat Top, the locomotive returning west, either light, with empties, or occasionally with westbound loads. In the latter case the train fills out to 4,700 tons at Flat Top yard and proceeds to Bluefield, a pusher being provided on Bluefield Hill. At Bluefield the time allowed for preparing the locomotive for its next trip is forty minutes.

Since the system was put in operation in 1915 more than 50,000 trains have been taken over the electrified section without a regeneration failure. Retaining valves are not used.

Power Despatching

All of the power for the electrified section is developed in one steam power house located at Bluestone. From the power house it is transmitted at 44,000 volts, 25-cycle single-phase to five substations, where it is stepped down to 11,000 volts and delivered to the trolley. The load sometimes changes from nothing to 25,000 kw. in a few minutes. One 3,250-ton train requires from 12,000 to 14,000 kw. for starting on a 2 per cent grade and about 8,000 kw. are required to move such a train up the grade at 14 m. p. h. Half of this power is used by each of the two locomotives and about one and one-half minutes are required to reach the speed of 14 miles. Naturally it is difficult under these circumstances to operate with a high load factor. A system of operation has been adopted, however, that has resulted in a 50 per cent load factor and a coal consumption of something less than 3 lb. of coal per kw. hr.

A record of all electric train movements is kept by the power despatcher at the power house. Telephones are placed along the right-of-way at all important signal towers or bridges. When a conductor has received his train he calls the power house and reports that he is about to start east or west from a certain place with a train of a certain tonnage and number of cars. This is recorded by the power despatcher on a log sheet and he also has the stokers and blowers speeded up to meet the coming increase of load. If it is not practicable to carry the increase of load with the number of boilers in service the power despatcher asks the conductor to delay starting for a few minutes.

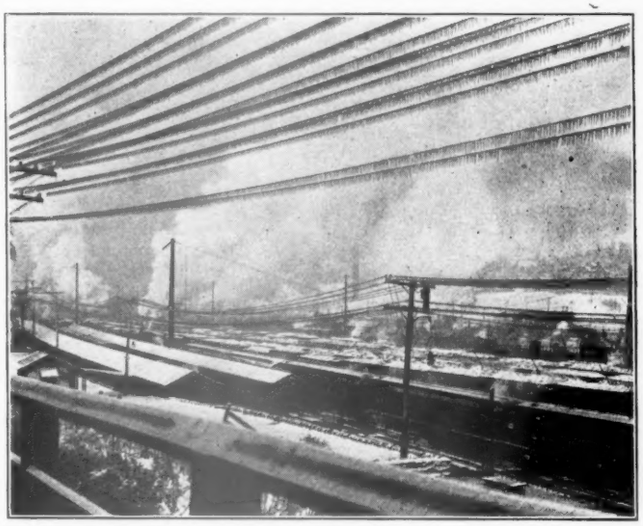
If for any reason a train is stopped at a signal for more than three or four minutes the power despatcher is again informed that it is about to proceed. This method permits the power house operator to anticipate the load, to forestall excessive peak loads and as a result operate with a minimum number of boilers and generators and obtain a high load factor and relatively high efficiency.

Overhead Maintenance

The 000 Phono-electric contact wire is supported by a 00 solid copper secondary messenger which in turn is supported by a ½ in. stranded steel primary messenger. The greater part of the main line overhead is supported by steel channels supported by tubular steel poles. In yards a built-up steel pole is used in connection with a cross catenary. The 44,000-volt transmission lines are carried on one of the steel poles.

A small car equipped with an elevating platform and also an insulated ladder, known as the "hot ladder," were provided for trolley maintenance. Now the platform car is seldom used and practically all overhead maintenance work is done with the ladder. As the name suggests the "hot ladder" is used for working on the catenary when the circuit is live.

As first installed a certain percentage of the auxiliary mes-



The Bluefield Yard. Sleet Like This Did Not Interrupt Traffic

senger was steel and the balance was copper. The action of the gases from the steam locomotives caused the steel wire to rust badly and it is gradually being replaced with 00 solid copper wire. This change will practically double the current carrying capacity of the overhead wires where iron was used as the secondary messenger.

A megger is used for testing insulators. If the test shows a resistance of less than 2,000 megohms the insulator is replaced. It is then taken back to the shop where cleaning may or may not bring the resistance, as measured by the megger, back to infinity. Wood pull-off insulators when taken down are dried out in the shop and revarnished.

In bonding the track originally, two 00 pin type, copper wire bonds were installed per joint, but in replacement only

one bond is put in. This maintains satisfactory continuity and the slight loss in conductivity is unimportant with 11,000-volt current distribution. The bond maintenance has been kept down by this practice.

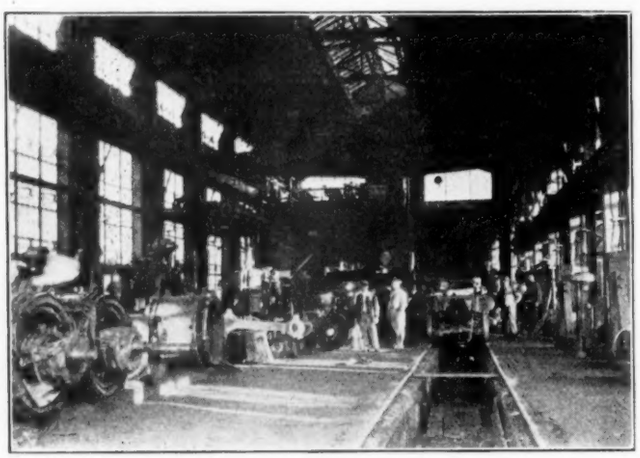
Sleet is not common in the southern part of West Virginia but has to be contended with occasionally. When there is sleet on the contact wire four pantagraphs are put up on the locomotives instead of the usual two. During sleet conditions, as shown in one of the illustrations, there was an insulator flash-over caused by a tree limb being blown over a trolley insulator. This slightly interfered with traffic, but aside from this, and occasional arcing at the pantagraph shoe, the sleet caused no trouble.

The wear on the contact wire has been measured and found to be between three and four thousandths of an inch per year on the main line. On branches and stub end yard tracks it has been somewhat higher.

Locomotive Maintenance

Maintaining the locomotives has at times taxed the ingenuity of all concerned. Frames have broken, been repaired and finally a new design of frame has supplanted the old. About half of the locomotives have been equipped with the new frames. The first new frame was installed early in 1920 and as yet none have failed. Crank pins and side rods suffered a similar fate, but the result of the repair and replacement has been highly satisfactory. Chattering wheel slip at first added much to the wear and tear on the locomotives, but it is now the exception rather than the rule.

Several other changes made in the locomotives are of general interest. For example, split babbitted bearings were used as main motor bearings, but were found unsatisfactory because of alinement difficulties and because of throwing oil, some of which would get into the motor windings. It was



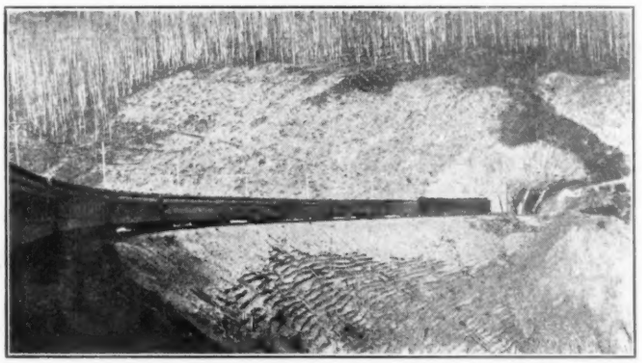
The Repair Shop at Bluestone

also necessary to provide drip pans under the gears to keep oil off the track. The split bearings are being replaced by the solid bearings with bronze inserts. These throw very little oil, do not show the tendency to run hot that the split bearings did and the bronze inserts are designed to prevent the motors from dropping down on the pole pieces in case the babbitt should flow.

There is a pinion on each end of each motor shaft. At first one of these pinions was shrunk on and keyed to the shaft, the other being shrunk on only. Now they are both shrunk on to the tapered ends of the shaft. The faces of the original pinions were flat and flush with the ends of the pinion teeth. The new pinions have an extended hub on the outer end, threaded so that a puller can be used and have an extended cup at the inner end grooved so that the oil which creeps along the shafts will be thrown back into the bearing well. A special transformer is used for heating the pinions before they are shrunk on.

Iron collector rings were at first provided for the main motors, but, seemingly due to vibration, they pitted and wore the brushes badly. Copper rings were substituted which have given satisfaction, many of them having the glossy chocolate brown finish considered ideal for commutators.

Several changes have been made on the water rheostats. Small particles of metal from the electrodes caused the outlet cylinders to stick in the gland. This was corrected by making a new gland with a collar which extended upward from the bottom of the rheostat tank for several inches into the liquid. The longest electrodes were also reinforced and the



A St. Paul Passenger Train as Seen from the Observation Car

level of the liquid is not allowed to get below the bottom of the plates. Originally the center electrodes could be lifted out of the rheostat tank while grounded electrode remained in the tank. This permitted a variation of distance between electrodes when assembled. The ground plates are now made integral with, and lift out with the others. Current limit relays have been applied to prevent the outlet cylinders rising too rapidly and thereby overloading the motors and slipping the wheels.

Headlights were removed from the top of the cab where they were close to the pantagraph and were placed on the forward and rear trucks.

A number of minor changes have been made to provide for better accessibility, better lubrication and for wear of certain parts.

The firemen or helpers, as they are called, say they consider the electrics simpler than steam locomotives. Inquiry into this statement brings out the explanation for this statement. Except in very few cases trouble or faulty operation of any part of the locomotive can be located and remedied by the helper. Even if a motor should burn out it can be cut out and the locomotive operated with three of the four trucks. Under these circumstances, of course, it may be necessary to reduce the tonnage.

The outstanding and pertinent facts are that a new type of locomotive was made to perform a service never before performed and was put into this service practically without experiment. Difficulties have been surmounted as they appeared and at no time have the electric locomotives been unable to handle the business that came over the division.

Electric operation has made it possible to handle the ever-increasing traffic that originates on this division. The far-sighted policy of adopting it has been profitable to the Norfolk & Western and the working out of the problems involved has been a service to all other roads confronted with similar problems.

Chicago, Milwaukee & St. Paul

Many factors were involved in reaching a decision to carry out the large electrification program of the C., M. & St.

P. and probably the most important of these was the desire to create a market for power. No complete figures have been published to show that the enterprise has been a success financially, but the data available indicate that such is the case. Some conception of the status of affairs may be obtained by a consideration of the following:

Operating and Capital Costs

The Pacific division has been operated electrically less than a year, so costs can now be considered only on the Missoula and Rocky Mountain divisions. A comparison of freight traffic operating costs from figures made available in 1918 shows that all costs affected by motive power on the Idaho division, which is steam-operated, were 90 per cent

The St. Paul Right of Way on the Western Slope of the Bitter Root Mountains

greater than those on the Missoula electrified division. On the Musselshell steam division they were 33 per cent greater and on the Rocky Mountain electric division these costs were 11 per cent greater than on the Missoula electric division.

The cost of maintaining and operating the transmission lines, substations, and trolley system, for the year 1919 is given in the table and a final figure showing the approximate total operating costs involved in the delivery of the electric energy to the locomotives.

OPERATING COSTS FOR 1919

Account		Total all services	Per unit
255.	Power substation buildings	$8,487	$606.00 per building
257.	Power transmission system	1,773	4.87 per mile
259.	Power distribution system	78,461	179.00 per route mile
261.	Power line poles and fixtures	24,269	55.50 per mile
306.	Power substation apparatus	40,224	2,870.00 per station
383. } 395. }	Train and yard power produced	102,152	7,300.00 per station
	Total	$255,396	

1.	Cost per thousand gross-ton miles trailing freight as actually distributed in accounts	28.8c
2.	Cost per thousands gross ton-miles train freight as actually distributed in accounts	24.9c
3.	Cost per thousands gross ton-miles trailing freight on basis distribution in proportion to freght kw.hr	30.2c
4.	Cost per thousands gross ton-miles train freight on basis distribution in proportion to freight kw.hr	26.2c
5.	Cost per actual kw.hr. delivered to locomotives	1.1c

The above unit figures include the cost of power.

Power is purchased from power companies and the cost of power at the high tension bus or point of delivery was 22.3 cents per thousand gross ton-miles trailing for freight service and 38.1 cents per thousand gross ton-miles trailing for passenger service. The freight traffic for the year was 2,476,085,000 ton-miles trailing and the passenger traffic 378,080,000 ton-miles trailing. The figures for the passenger service are approximate, as the ton-mile data are based on the assumption of an average weight per car, no record of particular cars handled in all the separate trains being available.

The above figures were taken from reports that have been issued from time to time and from them it appears that the savings in operating costs may vary from 20 to 90 per cent. This must be balanced against an additional capital charge, due to electrification, of about $23,000 per route mile. The construction cost, exclusive of locomotives, was $17,579 per route mile. In the first figure given, the value of the steam equipment displaced has been subtracted.

Power Supply

All power for the electric operation is purchased and is delivered to the railroad as 100,000-volt, 3-phase, 60-cycle current. Power for the section between Avery, Idaho, and Harlowton, Montana, is obtained from the Montana Power Company. To prevent the total power demand from exceeding a certain value, apparatus called a power indicating and limiting system is installed. When the power demand reaches a predetermined value, the trolley voltage is reduced automatically. The train speeds are, of course, also reduced accordingly and the reduction of voltage and train speeds continue until the total power demand falls off to something less than the predetermined value. Such a system was installed between Harlowton and Deer Lodge, Montana, in 1918 and on the sections between Deer Lodge and Avery, Idaho, early last year. Train speeds are reduced by this system from 2 to 13 per cent of the time, depending upon the amount of the traffic and the arbitrary value of the limit setting

Power for the Pacific electric division which extends from Tacoma to Othello, Wash., is purchased from Inter-Mountain Power Company. This section was formally put under electric operation on March 5 last.

Motive Power

The first consignment of locomotives was purchased from the General Electric Company and consisted of 12 passenger, 30 freight and 2 switching locomotives. The freight and passenger locomotives were identical except for the gear ratio between the motor pinions and the gears on the main driving axles, as it was considered desirable at that time to have only one type of locomotive for both kinds of service. These locomotives are of the 4-4-4-4-4-4 type and the 12 passenger locomotives have now been regeared for freight service.

Two more switchers have been added and 15 new passenger locomotives were purchased and delivered during the latter part of 1919 and the early part of 1920. Ten of these were supplied by the Westinghouse Electric and Manufacturing Company and are of the 4-6-2-2-6-4 quill geared type and the other five were supplied by the General Electric Company and are bi-polar gearless locomotives with a 2-4-8-8-4-2 wheel arrangement. These locomotives were described in the following issues of the *Railway Age:* December 3, 1919, page 819; January 16, 1920, page 233 and March 26, 1920, page 1051.

Operating Results

The manner in which trains are handled with electric locomotives will be described in a series of three articles which will appear in early issues of the *Railway Age.*

The following are some particularly pertinent statements pertaining to the results of electric operation which have been made during the past year by different men familiar with conditions on the road:

"Nearly 30 per cent more tonnage can be handled by electric operation in about 80 per cent of the time it formerly took to handle the lesser tonnage by steam operation.

"The consensus of opinion of the roadmasters and superintendents of the electrified zone is that there is no more slipping of the locomotive wheels on the rail and consequently no more damage to the top of the rail under electric operation than there is with steam locomotives. It has not been found that there is any greater tendency for the rails to creep on account of regenerative braking on de-

scending grades than there was under the braking action of steam locomotives. No case has been found where electric locomotives moving at a high rate of speed have tended to displace the rail on the ties or the ties on the ballast. Roadmasters agree that the electric locomotive is easier on the track than steam locomotives because of less rigid construction. It is stated that the flange wear on curves under electric operation is actually less than under steam operation for the reason that the electric locomotives are less rigid in their wheel arrangement than the steam locomotives.

"One of the marked economies effected by electrification is the reduction of train and enginemen's expense, on account of the increased ton-miles per train mile and per engine-mile and the reduction of equipment repair and roundhouse expense.

"The spacing of trains to hold down the power demand has in combination with the action of the power indicating and limiting system worked out very well. When the load factor was running 60 per cent or higher, the automatic slowing up of trains involved an increased expenditure for freight train and enginemen's time of about 10 per cent. With a load factor of from 50 to 55 per cent, however, the limiting action takes place through only a small part of the day, and while there is a considerable reduction in the maximum demand, there is little effect on the operation.

"As to ease of starting trains, this feature of electric operation is noticeable, conducing to increased comfort of passengers.

"The technical result of the electrification has been quite a success. The financial result, due particularly to fuel and labor conditions, and the indirect value due to publicity of this operation, are equally satisfactory.

"Even allowing for the increased investment charges, the items of operating expense, depending directly upon motive power, are so reduced and additional benefits indirectly obtained are so great as to justify consideration of extending the electrification even on sections with easier grades."

The Pennsylvania's New Agreement With Trainmen

THE MANAGEMENT of the Pennsylvania Railroad System on December 29 concluded with the representatives of its engine and train service employees a mutual working agreement, regarding the settlement of future labor differences, which, it is expected, will eliminate any question of strikes on that road, as far as train operation is concerned; and a statement has been issued by the company, explaining what has been done, substantially as follows:

This agreement is the outcome of a series of meetings between representatives of the company and of the engine and train service employees, which began in Philadelphia on December 21 and terminated at Pittsburgh on the 29th. Both sides are ready to apply the new principles with the beginning of the new year.

The classes of employees who, through their accredited representatives, have joined with the management in this matter are the enginemen, conductors, firemen, hostlers, trainmen and switch-tenders. As a medium to carry out the purposes of peaceful settlement there has been established the "Joint Reviewing Committee of the Pennsylvania Railroad System" for the settlement of all controversial questions affecting the engine and train service men. Through this committee, the employees involved will, for the first time in the history of this railroad, have equal voice and vote with the management, as the committee will constitute a court of review involving grievances, rules and working conditions, including discipline.

The joint reviewing committee will be composed, on behalf of the management, of two representatives from each of the four "regions" of the system, and, on behalf of the employees, of the general chairmen of the men in the engine and train services. The vote of all members, whether representatives of the management or of the employees, will be of equal power and not less than a two-thirds vote will be necessary to reach a decision upon any question presented.

In all matters, except individual discipline cases, the full committee will vote, and its decisions will constitute precedents, which will be binding equally with respect to similar existing or future cases, upon the management and the employees in all four regions of the system uniformly.

Discipline cases will be handled somewhat differently, as they involve a personal element which must be accorded recognition. It has, therefore, been decided that when such a case comes before the joint reviewing committee, the two representatives of the management in the region in which the case arises, together with the representatives of the employee involved, shall not sit as members of the committee, during consideration of that particular case, but shall act as counsel for the presentation of their respective claims. The remaining members will hear the case and determine the matter at issue. This will insure expeditious handling and fair judgment upon all discipline cases.

The work of the joint reviewing committee will be supplemented by an extension of and improvement upon the methods of handling differences and grievances which were in effect prior to the war. Each division superintendent will have a meeting once a month with the local chairmen of the engine and train service employees under his jurisdiction, at which either side may present matters for consideration. Each general superintendent will have a monthly meeting with the general chairmen, and the general manager of each region will also hold monthly meetings with the general chairmen.

Appeals may be taken in the order named, and appeals from the decision of a general manager will be taken to the joint reviewing committee of the system. Thus, in the final determination of any matter, the employees, through their representation upon the joint reviewing committee, will have equal power with the officers in determining the issue. In this manner, the employees will participate in each step in decisions affecting their personal welfare and the conditions under which they work.

The joint reviewing committee will meet monthly in order that all pending matters may be promptly determined.

For the purpose of definitely establishing decisions and interpretations of committees upon the whole of the company's lines a provision has been adopted to the effect that whenever an agreement is reached regarding any particular controversy, between the representatives of the management and men—whether at a superintendent's meeting, a general superintendent's meeting, or a general manager's meeting—the settlement agreed upon will at once be placed in effect; but its terms will be immediately reported to the joint reviewing committee. The joint reviewing committee, in its turn, will at its earliest convenience, either ratify the ruling as adopted, or modify it as may be thought best: and the principles so established will then become binding upon the management and employees in all regions, and will govern all existing and future cases of a similar nature.

"The management feels justified in expressing the conclusion that the understanding reached should not only make future strikes wholly unnecessary, but should obviate even the necessity for ever taking a strike vote among the engine and train service employees of this railroad, if both sides live up to the friendly spirit in which the understanding has been established."

Developments In Material Handling Methods

The Railroads Are Making Increasing Use of Mechanical Equipment in the Movement of Freight

THE MOST INTERESTING of recent developments in the use of material handling machinery on the railroads has been in its application to the handling problems presented in the movement of freight. It would probably not be far from the truth to say that all important facilities planned or built recently for handling less-than-carload freight have been so designed as to permit of the use of material handling devices. Also during the past year or so various existing layouts for handling less-than-carload freight have been modernized through the utilization of material handling machines, thus speeding up the operation of the plant and effecting important economies. Likewise many layouts for handling loose bulk material in carload lots, which are predicated entirely on the utilization of machines, have been completed recently or planned during the past year. In pointing out the advantages to be derived from the use of the various material handling devices it is necessary also to describe, in some detail, the layouts in which the machines function.

> THE railroads probably offer as great an opportunity for the application of material handling machines as any other single industry. Such devices are used by the roads in construction, in maintenance, in the shops, at locomotive terminals and for various other purposes. In view of the fact, however, that for years the roads have been handicapped by insufficient terminal facilities it is the application of machines to handling problems at terminals that is of outstanding interest at this time.

Among the larger recently constructed freight terminals, in which improved methods of handling freight have been tried out with gratifying results, may be mentioned the New York Central terminal at Cleveland. Briefly, this layout consists of an inbound house 38 ft. wide and an outbound house 75 ft. wide. Both houses are 1,262 ft. in length and are separated by four sets of two railroad tracks which are in turn separated by island platforms 16 ft. 6 in. wide. A platform 50 ft. in width located at the far end of the layout connects the two houses and the island platforms. Double leaf hand-operated trucking bridges, placed at approximately the one-third points, provide additional connections between the two houses and the platforms.

The mechanical equipment includes fleets of storage battery tractors and trailers and dollies in standard forms and in special forms for special service; lift type storage battery trucks and skid platforms; portable sections of gravity roller conveyor, and a hoist for handling the heavier shipments.

Outbound freight is received from street vehicles and usually is loaded directly onto the trailers. The sections of portable gravity roller conveyor which are mounted in frames designed to suit the conditions are useful in effecting the transfer of the ordinary run of packages from the street vehicle to the trailers. The hoist, which consists of a suspended I-beam runway extending 8 ft. out into the drive and 16 ft. into the house, and which is equipped with two three-ton geared trolley hoists, which operate independently, serves in transferring the heavier packages from the street vehicles to the trailers.

Each trailer is loaded, always, with freight destined for one car. After loading, the trailers are classified by hand into groups destined for a certain section of the house and assembled into trains of six or more trailers. Generally it is possible to so make up the train that the trailers may be cut off progressively, beginning at the rear. When all loaded

trailers have been delivered the tractor makes the return trip, picking up the empties on the way.

Each section of the inbound house is equipped with a large number of skid platforms and one lift type truck. The inbound shipments are handled from the cars by tractors and trailers and where possible the trailers are loaded with freight for one consignee and always with freight destined for one section of the house. When the size of a consignment justifies it, the trailers are unloaded onto the skid platforms where the shipment is held for delivery to street vehicles, the last shift being made with the lift trucks. This arrangement permits of deliveries being made without the re-handling of the shipment, thus saving much labor and reducing the likelihood of damage to a minimum.

Modernizing Existing Layouts

Mantua (Pa.) transfer freight station of the Pennsylvania Railroad, which consists of a building 1,200 ft. long and 16 ft. to 30 ft. wide, flanked on both sides by 13 tracks, having a combined capacity for 360 cars, may be cited as typical of the remarkable results obtainable from modernized layouts.

Approximately 135,000 tons of package freight is handled annually at this station. Until recently the transfer movement was made with hand trucks, each trucker handling about 10 tons of freight daily. With the hand trucks replaced with a fleet of 11 storage battery tractors and approximately 600 trailers three men are able to handle an average of 70 tons of freight daily. As a result of this installation night work has been dispensed with, the working day has been shortened and an important saving has been made in the cost per ton of freight handled.

Motor Trucks Replace Trap Cars

Probably the most interesting recent development in freight handling on the railroads is the use of motor trucks for interchange and trap car shipments at Cincinnati, which was described in detail in the *Railway Age* for August 6, 1920. Briefly, this is a system for transferring less-than-carload freight between local freight stations by the loading of package freight at the stations into demountable containers or truck bodies which are transferred from motor chassis by mechanical means and are then moved from one station to another on motor trucks.

The mechanical equipment required in this service includes the motor trucks, the demountable bodies, and facilities at each station for transferring the bodies from the trucks to the floor of the station, and vice versa. The transfer facilities consist of a light steel superstructure erected over the driveway and floor locations of the demountable bodies. This supports the electric hoists which are provided with a weaving device to insure accurate aligning of the demountable body with the truck chassis, and are equipped with Sprague standard hoist units of 7½ to 10 hp. for lifting, and 2½ hp. traveling motors.

As a result of this installation the cost of handling freight between the 35 stations has been reduced 35 cents per ton, 15 per cent of the existing platform area has been released for other use, nearly 200 cars have been released from continuous trap car service for the handling of other commodities and switching service has been done away with involving approximately 300,000 switching cuts annually.

A New Application for Car Unloaders

The grain elevator recently completed by the Pennsylvania Railroad at Baltimore and described in detail in the *Railway Age* for July 2, 1920, presents some interesting developments in the application of machines for handling loose bulk material. This plant is equipped with four grain car unloaders, each machine consisting of a sidewise-tipping cradle mounted on an endwise tipping table, an appliance for opening the car doors automatically and a grain receiving hopper placed on the side of the tipping table. In operation the machine tips the car on its longitudinal axis 30 deg. towards the side on which the receiving hopper is located, thus forcing the car door open. This causes the grain near the car door to run out, then with the car still in this position, it is tipped endwise 45 deg. by the table, first with one end up and then the other, so that grain in the ends of the car will run out.

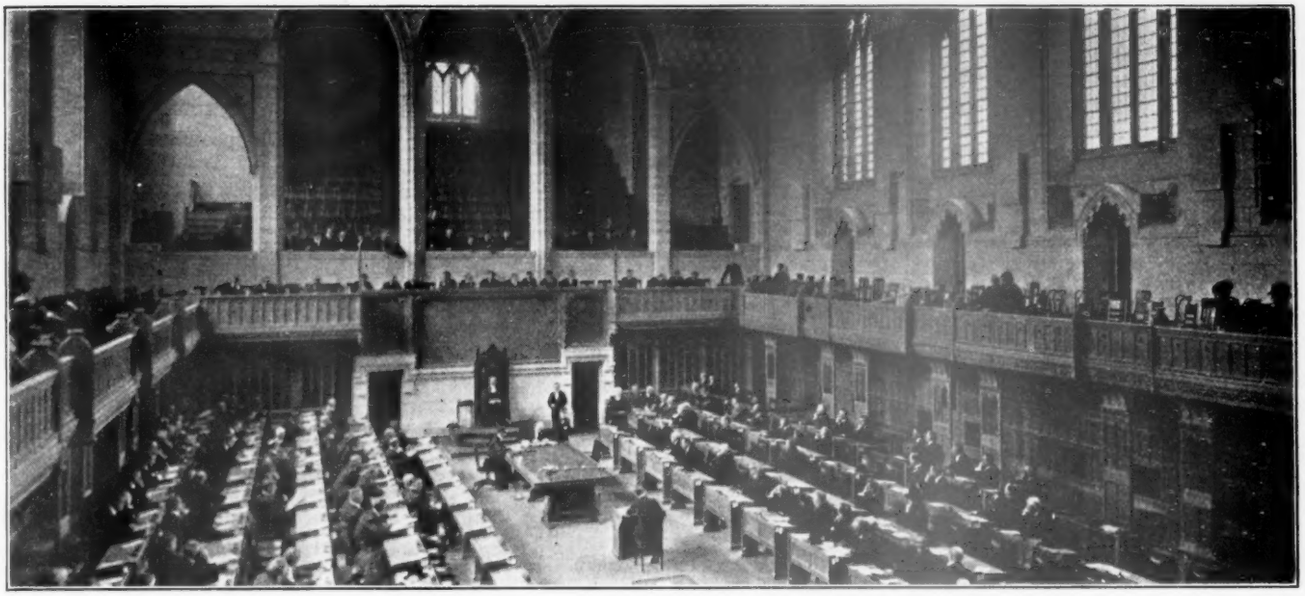
The entire operation of unloading a car with this unloader requires less than 10 minutes. Only three employees are required to operate the unloader and attend the car during the process. In other words, the machine will accomplish as much in 10 min. with three men as four men can accomplish in 45 min. with the use of a power shovel.

As the grain is dumped from the cars it falls into a steel hopper discharging to a 42 in. belt conveyor which delivers to cross belts running to four receiving legs or elevators for delivery to the garners. From here it falls by gravity to scales from which it can be delivered to the cleaner and dryer.

Nine shipping legs are provided for elevating grain for shipment.

Photo by Keystone View Co.

A View of Salida, Colorado, Showing Railway Yards



Members in Session in the New Parliament Building in Ottawa. Phot. Copyright, Keystone View Company

Railway Developments in Canada in the Year 1920

High Gross and Low Net Earnings; Increase of Government Ownership and Management; Future Prospects

By J. L. Payne,
Comptroller of Statistics, Department of Railways and Canals

COMPLETE OPERATING RESULTS for the calendar year 1920 are not yet available; but sufficient information is at hand to warrant the statement that the railways of Canada established a record in the matter of high gross earnings. They also established a record for high operating expenses. The result was the lowest net earnings per mile of line for many years. Materials and labor cost so much more than in preceding years that, notwithstanding the fillip given to receipts by higher rates, the railways fell behind. It is to be feared that on this side of the line, as on the other, there is a prevalent opinion that railways have some occult way of escaping the high cost of living which is denied to individuals. This would appear to be the case, since the application of the railways for better tolls to enable them to hold their heads above water was sternly and vigorously opposed.

It may be well to make clear the basic reason for this attitude on the part of boards of trade and other Canadian bodies. The Canadian Pacific is unquestionably prosperous. It has resources which other lines lack, and those resources have an important bearing on its net earnings. Nevertheless, the Canadian Pacific has been suffering a steady diminution of net earnings in common with the few other roads in the Dominion which are able to do a little better than make one hand wash the other. For example, for the ten months ended October 31 last it showed a gain of $29,701,408 in gross receipts over the same period in 1919. In spite of this it had a decrease of $1,543,090 in net earnings; for while gross earnings had increased by 20.8 per cent, operating expenses had increased by 27.4 per cent. Yet the Canadian Pacific has been able to maintain its substantial dividend payments on common stock, and when the case of all the railways is presented there are many people who see only this single road which has done well.

IN THE 10 YEARS ended 1919, gross earnings per train mile increased 209 per cent, while operating expenses increased 323 per cent. Yet such relief as has been offered in increased rates has been bitterly opposed.

The government now operates 52 per cent of the railway mileage, although the question of government ownership has never received serious public consideration

All conditions at the moment are more or less adverse; it may be characterized as a period of "anxious waiting."

Just how seriously the railways of Canada were pinched during 1920 may be easily figured out by studying the still unpublished official figures for 1919. In that year 36 units out of 72 failed to earn operating expenses. Of the remaining 36, only 14 were able to pay fixed charges, and of these 14 just 5 had net corporate earnings available for dividends. It is only fair to say that this result was not unique for 1919. That has been the situation, except in lesser degree, for at least the past six years. It was probably intensified in 1920.

It is quite true that gross earnings have shown most encouraging advances during the past decade in particular. In 1910 they were $173,956,217; for 1920 they probably

exceeded $430,000,000. It is, however, quite misleading to base assumptions of prosperity on a single fact of that nature, as students of transportation statistics know full well. Gross receipts must always be measured by certain established standards before their real importance can be determined. Thus, while in Canada an increase of 147 per cent may be assumed to have taken place during the past decade in the volume of total receipts, the increase per mile of line has been only 110 per cent. Put in another way, and answering to a test which goes to the very pith of the whole matter, while in the ten years ended 1919 gross earnings per train mile grew by 209 per cent, operating expenses per train mile grew by 323 per cent. That is really a startling change.

Earnings Up 25 Per Cent; Expenses Up 51 Per Cent

There is still another way of setting forth the results of this crucial test. While in 1914 the credit balance created by the difference between gross earnings and operating expenses per train mile was equal to 35.8 per cent, in 1919 that percentage had shrunk to 11.8. During that same period, 1914-19, while gross earnings went ahead by 24.7 per cent per mile of line, operating expenses expanded by 51.2 per cent. It is important to keep the facts for the years since 1914 clearly in mind; for it was coincident with the outbreak of war that severe pressure came upon the railroads. It may help to a better appreciation of the position into which that pressure forced the railways of the United States and Canada if at this point the significant difference between the opportunities of a railway corporation since the commencement of the war period and nearly all other classes of corporations is emphasized.

While the latter were able to adjust their selling prices almost at will, raising them to whatever levels they deemed expedient to meet the rising cost of production, the purveyors of transportation were held rigidly to the earning rates which had been fixed before 1914. It was not until 1918 that any relief at all was granted. Then that relief was bitterly opposed. It was not sufficient, however, except for immediate purposes. The cost of materials and labor continued to rise. After enduring these conditions for two years, a further advance in rates was permitted in 1920. This, at all events, was what happened in Canada. Everybody is familiar with what the unchecked carriers by water did during that same long period of steadily ascending prices. They raised their rates 100, 200, 400 and up to 800 per cent. What would have been the financial position of the railways of North America today if they had been as free to regulate their tolls as were these carriers by water or as were other producers? This is neither an inept nor an unreasonable question.

Government Acquires Grand Trunk

By every test which may be fairly applied the railways of Canada have been having a hard time since 1914. Their experience has made many hundreds of millions of dollars of investment unproductive. This has been peculiarly true of the year 1920, because it brought many roads to a very serious state. Yet they have all borne these adverse conditions heroically, and no one may charge them with not having tried to help themselves as far as was humanly possible. They enforced economies both directly and indirectly. That is to say, they cut operating expenses with a ruthless hand, and brought every available device of administrative skill to bear on the reduction of train mileage and car mileage, while on the other hand they increased the carload and trainload. They achieved wonders in all these respects. And still they had to sit down at the end of the year and face a further shrinkage of net earnings. If this were the story of an individual or an ordinary commercial corporation it would provoke sympathy. The railways have learned to grin and bear it.

Aside from financial consideration, the outstanding fact in the history of Canadian railways in 1920 was the absorption of the Grand Trunk into the Canadian National Railways system. This followed the setting up of that system in 1918, when the Intercolonial and Prince Edward Island railways, which had been the standing examples of government ownership as growing out of the pact of Confederation in 1867—the Canadian Northern, the National Transcontinental, the Grand Trunk Pacific and the Grand Trunk Pacific Branch Lines were thrown into a single operating group. Thus in May, 1920, with the bringing in of the Grand Trunk, the principle of public ownership and operation was directly applied to a little over 52 per cent of the entire railway mileage of the Dominion. It will not be out of place, even though it may represent in some degree the reiteration of what has already appeared in these columns, to present in succinct form the causes which operated to bring about this exceedingly important change in the Canadian railway situation.

It began with the collapse of the Canadian Northern and Grand Trunk Pacific, which really took place in 1914, but was not carried to the point of positive assumption of full operating responsibility by government until near the end of 1917. In fact, some of the steps were not formally taken until 1918. It must be definitely understood that what took place in this regard was dictated by the imperative demands of necessity arising out of the fact that the bonds of these roads had been guaranteed to a high proportion by both the federal and provincial governments. It will not be necessary at this time to take up space in setting forth the full measure of these obligations. It must suffice to say that the Dominion Government deemed it a public duty to keep these properties in operation. As the chief guarantor, the Dominion Government felt impelled to do this for the further reason that it was the only avenue of possible escape from further serious losses. The interests of the growing west also demanded it, since nearly all the mileage was in that section of the Dominion. Under any circumstances the responsibility would remain unaltered.

The Grand Trunk, while hard hit by reason of its primary guarantees on account of its subsidiary, the Grand Trunk Pacific, was not without resources. But the time for financing on a comprehensive scale was inopportune. Moreover, the government needed the old established system in the east to complete the scheme of the Canadian National Railways. The time was favorable for such a change, and after protracted negotiations the matter was brought to an issue early in 1920. The shareholders of the Grand Trunk approved a bargain under which, without going into a mass of details, the government should be given control by becoming the purchaser of the common and preferred stock rights. With that control there passed at the same time to the government practically full responsibility for the liabilities of the Grand Trunk. The operating rights were taken over in May last, and the terms of purchase, subject to certain statutory limitations, will be adjusted by the usual process of arbitration. That process is now under way.

Not Due to Definite Policy

Before passing to the consideration of what this tremendous change means, and may mean, so far as the Canadian people are concerned, the fact cannot be too strongly accentuated that these happenings did not follow the adoption of a definite policy in favor of substituting public for corporate ownership. They came about as the direct result of irresistible circumstances. The matter was not made an issue before the electors. There was scarcely time to do that. Anyway, the liability arising out of the guarantees could not be pushed aside no matter what might be the wishes of either government or people; and that liability dominated all considerations. To put it in homely phrase—and there is no other way of doing it so lucidly—the people of Canada

had endorsed the bonds of certain railways which subsequently fell into bankruptcy, and have been obliged to take over the properties secured by those bonds in order to try and reduce the ultimate volume of loss to themselves. They were the trusting endorser. They have never expressed any judgment on the broad question of state control as against private control, since necessity dictated what they should do rather than considerations of policy.

There will be a natural interest across the line in this vast enterprise bearing the stamp of nationalization, and the first question would probably be with respect to results. For the fiscal year 1920 the responsible minister announced a deficit of $47,000,000. For the preceding year it was several millions under that total on the basis adopted by the Department of Railways and Canals. In an impressive and well-organized speech the minister frankly told Parliament that the deficit for the year did not include any fixed charges attaching to the Intercolonial, the Prince Edward Island or the National Transcontinental. He could not have presented more than an estimate; for the capital accounts of these roads have not been kept on the basis applied to corporate lines. The Minister of Finance has recently intimated that an effort will be made to set up a correct account.

This aspect of the matter is so important that a word or two of explanation would appear to be necessary before the situation as to fixed charges can be understood. In official statistics the sum charged on account of capital outlay is placed at $330,062,719; but that is the bare cost of construction, and neither includes any interest charges during the building period nor subsequently. Therefore, to compare the Intercolonial with the Canadian Northern, for example, is impracticable. If accumulated fixed charges were now added, the total would, of course, be very materially increased. This was made plain to Parliament by the Minister of Railways some months ago. As the capital account of these three government roads has not been made comparable with the accounts of other units in the Canadian National group, it would scarcely be proper for the writer to indulge in a purely speculative calculation. Others, however, have made the attempt and their figures run into large totals. It must suffice to say that whatever may be the correct capital account, it would, to the extent of the fixed charges attaching hereto, swell the deficit announced by the minister. When the account is brought down to the present time, it would, quite unavoidably be swollen by the accretive power which is exhibited in the proverbial rolling snowball—in other words, by the compounding of interest charges over a long period of years. Moreover, into the final account must be thrown the advances made to the Canadian Northern and Grand Trunk Pacific, and which now aggregate more than $150,000,000.

What of the Future?

What of the future? No one could pretend to do more than guess. The Canadian National system, with its lines running from coast to coast, and branching northward and southward in many directions, will be as dependent as other lines on the development of traffic. As settlement proceeds—and the immigration authorities tell of the brightest prospects in that respect—the government roads are bound to receive the stimulation which such a movement carries with it. They are in a position to meet large demands for public service, although they are still short of urgently required equipment. That is in process of being remedied. They are in capable hands from the administrative point of view, and there is a reasonable prospect that by cutting out a considerable parallel mileage in the west economies in operating cost may be brought about. On the other hand, there is great pressure upon the government to build new branches and to extend existing lines into parts of the country where land has been taken up by settlers. That pressure can only be relieved by favorable action. Some considerable work in standardization has also to be done.

The people of Canada are aware of the burden which rests upon their shoulders to the extent of announced deficits, and they have been candidly told that this burden will be swollen by very considerable charges which have not yet been calculated. There are no signs, in the press or on public platforms, that they are either alarmed or fretful. On the contrary, the attitude of the public mind expresses resignation. They understand that a great task has been assigned to the men who are operating the government system; but D. B. Hanna, the president and chief executive head, appears to command general confidence. There is a feeling that the best is being made of a situation which will not lose any of its grave aspects by the raising of an uproar. They are willing to give the management a free hand and to await results. But they would be surprised if, while they are waiting, a visitor from the United States should ask them why they had swung so pronouncedly over to the side of state ownership. They would tell him at once that the matter had never been considered on its merits; that what had been done had grown out of their position as endorsers of railways bonds. And that would be the whole truth.

Practically No Additions to Mileage

Coming back to the railway field as a whole, it may be said that wholly trivial additions have been made to mileage during the past two years. F. P. Gutelius, of the Delaware & Hudson, said the other day before a Canadian tribunal that any railway which was built under present conditions would not be able to earn fixed charges. That is probably true. We have just seen that many roads which were constructed in the years when prices were low are unable to earn any return on investment. Worse than that, a high percentage of them cannot pay their way at all. This situation as to earning power no doubt has had something to do with the practical stoppage of railway building in Canada; but the controlling reason is to be found in the fact that our transportation needs, apart from new districts in the west, have probably been met. While our railway mileage expanded by 130 per cent within two decades our population grew by but 70 per cent. Out of that grew our railway problem and the scheme of nationalization to which somewhat extended reference has been made.

Canadian railways are slowly picking up on lost time in the matter of equipment. During the war period they could do very little in that respect. They actually stood still for four years. Now they have to pay terrifying prices, both at home and abroad. But every road in North America knows all about that.

The labor situation is satisfactory in the sense that there are no strikes on nor are any threatened. We have never had serious trouble with the unions on this side of the line. The unions themselves are represented by rather superior men, conservative and considerate in their attitude, and nothing has ever happened to arouse bitterness. At the same time, the railways of Canada feel acutely the pinch of labor conditions. Whatever advances are made in the United States are invariably demanded and conceded on this side.

The whole situation might be summed up within the words "anxious waiting." All the conditions are at the moment more or less adverse. Traffic has not increased since 1918; in fact, it has rather decreased in volume. On the other hand, rates have been advanced to a point which is supposed to take care of the increased cost of operation; but the story of shrunken net earnings is plainly told in the railway accounts. Meanwhile, it is doubtful if the people of North America clearly realize that they are getting transportation service at a lower ton-mile cost than that borne by the people of any other country under the sun.

The Problem of Rates on the Canadian Railways*

Delicate Question to So Adjust Them As to Be Fair to Government and Privately Owned Railways

By E. W. Beatty
President, Canadian Pacific

THE YEAR 1921 is apt to be of great significance in the railway progress of Canada. It will be a year of test and it will be incumbent upon all the companies to reduce costs by economy and efficiency in order that rates may be reduced as speedily as possible. Canadian transportation companies cannot expect the Canadian people to continue paying high rates if by any act of the railway companies expenses can be reduced sufficiently to permit of these rates being lowered.

Under the present conditions of operation the rates are none too high—in fact, would prove inadequate if the volume of traffic even slightly diminished. The period, however, is one of readjustment and the tendency towards lower costs will undoubtedly become more marked during the coming year. These conditions must be taken full advantage of in order that rates may be adjusted to a more normal basis. That this will be done goes without saying as there is not a transportation officer living who would not prefer the prosperity of his enterprise to be accomplished on a moderate scale of rates and a heavy and free movement of traffic rather than in any other way.

A Unique Situation

Canada is blessed or handicapped, according to your point of view, with a very expensive railway mileage, a mileage somewhat out of proportion to its population and the transportation necessities of the country at the time a great deal of it was constructed. That improvident construction has brought about an evolution in administration which has been considered inevitable. It has brought a condition which is unique and has no parallel in any other country in the world so far as I know. It means the ownership of the principal systems by the government and the Canadian Pacific respectively and the extents of their respective systems are almost equal.

The situation, which is unique, is that of a private enterprise competing with a government owned enterprise, both, however, subject to regulations by an independent tribunal, the Railway Commission. The existence of this condition naturally creates a situation which imposes upon the government an obligation to exercise an almost judicial attitude towards its chief transportation competitor, while at the same time pressing by all legitimate means the interests of the National Railways against that competitor. It is not necessary for me to elaborate the fact that such an attitude is as difficult as the position is delicate, and to exercise even-handed justice in such circumstances requires an intimate appreciation of national necessities and of the national consequences of a policy which involves unfair discrimination.

The appreciation of service rendered, when it is properly rendered, is the greatest possible protection to a corporation, and if the government's position is difficult by reason of its large direct interest in one enterprise, still the government reflects in its policies the sentiment of the people as a whole, and the sentiment of the people is in a vast majority of cases towards fair competition. But I have another reason for suggesting that the situation gives not the slightest ground for alarm, and that is the acceptance by the government of an existing condition not altogether of their making and a determination, as expressed through their responsible Ministers, that fair and equal competition will be indulged in.

Real Problem Is That of Rates

Two theories have been advanced as to the national attitude or the attitude of Parliament towards the question of railway rates. One is that the rates should be such as would enable the National Railways to become self-supporting both as to operating expenses and fixed charges almost immediately. The other is that the rates should not have been increased but that the resultant deficits should have been borne out of the national treasury and the treasury of the Canadian Pacific Railway respectively. Both are equally unsound and as usual the correct course is to be found somewhere between the two extremes. It would be quite improper that you and I and all individuals and companies should be taxed more than they otherwise would be taxed so as to enable shippers of freight to have their produce transported at rates which are less than reasonable. It would be equally improper that the whole burden of maintaining National Railways should immediately be placed upon those who utilize the properties because in the position of that company with its numerous added properties, built not for co-ordination but for competition, it should not be expected to become paying until the development of the country caught up with the extensive over-construction.

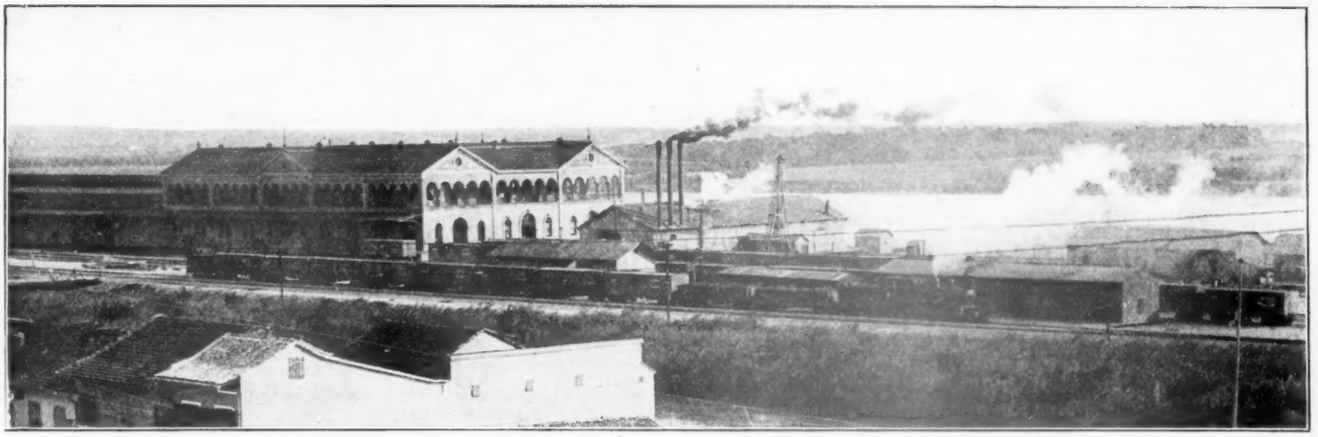
While it is, in my opinion, not desirable that governments should intervene in railway administration unless forced to do so, it has one immediate result in enabling them, and through them the people they represent, to appreciate in a fuller measure and in a greater degree the difficulties involved in railway administration, and the burden imposed by unsuccessful operation.

A Recent Misapprehension

The recent temporary advances in freight rates and passenger rates have been, I think, somewhat seriously misapprehended in many places in Canada—a misapprehension which would be removed by a closer scrutiny of the conditions under which the operations are now being carried on and would result in a more generous attitude towards the railway companies.

One of the small beginnings which have added to the difficulty of the railway situation in the United States was this very lack of appreciation of the railway companies' needs by public tribunals up to the year 1917. The railways were not altogether free from blame in bringing this about, because initially their attitude of inelasticity in dealing with the public developed a sentiment which found reflection in the Acts of Congress relating to transportation and to the administration under those Acts of the Interstate Commerce Commission. That commission seemed, in former years, to regard it as its paramount duty to permit the railways to suffer if by so doing the interest of the public was temporarily advantaged. Obviously this was an incorrect view, the duty of any commission so established being to protect the interest both of the companies and the proprietors of them and the public, rather than that their influence should be directed in favor of either one or the other of the parties in any controversy affecting the railway and the public.

*Extracts from an article in the annual Financial Survey of the Toronto "Globe."



Custom House and Freight Train. National Railways of Mexico, Tampico, Mex. Photo Copyright, Underwood & Underwood

The Present Railway Condition in Mexico

Capital Needed for Rehabilitation of Motive Power and Cars and Expansion of Facilities

By W. M. Whitenton
Assistant Chief Operating Officer, Missouri, Kansas & Texas

THE WRITER recently returned from a two weeks' trip covering approximately 3,000 miles of railroad in the Republic of Mexico, entering through the Laredo gateway and returning through the Eagle Pass gateway, visiting the cities of Monterey, San Luis Potosi, Mexico, Guadalajara, Aguascalientes, Durango, Torreon and Monclova.

The last time previously that I was in the Republic of Mexico was in the Spring of 1908. Naturally, I was interested in the changes which have taken place since that time. My greatest surprise was in finding the roadbed of the lines over which I traveled in such a good physical condition. Most of the line from Laredo to Mexico City is laid with 85 lb. rail, in good condition, with good joints, ample ballast and ties. Considerable work has evidently been done on this track during the past five or six months, as the line, surface and drainage, is excellent. Our train jogged along at a speed of 40 to 55 miles per hour with comfort.

Between Mexico City and Guadalajara, Aguascalientes and Durango, and Durango and Torreon, there is a mixture of 75 and 85 lb. rail, all in very good condition, but the track does not show the excellent condition which prevailed so noticeably between Laredo and Mexico City, although there is no "real bad track." Some of it has good ballast, while there are stretches where there is no ballast.

The line between Torreon and Monclova is in good ordinary condition—75 lb. rail and fairly good line and surface—but it shows evidence of insufficient tie renewals. Between Monclova and Eagle Pass the line is light 56 lb. rail which is in need of ties, and the banks are narrow. This is the poorest piece of track I saw on the entire trip.

Bridges in the Durango-Torreon district suffered a great deal from the revolution. All the wooden structures were destroyed; some of them several times. They have been rebuilt, however, but in many instances only temporarily. A good many of the steel structures were dynamited and damaged by various other means. Most of these have been replaced and repaired.

Summing up the track conditions, I would say that it will, on an average, compare favorably with much of the track in the United States, and is capable of sustaining a considerable traffic, provided it is given a reasonable maintenance allowance.

Station and shop buildings, roundhouses, and various other similar facilities, in the territories where the revolution dominated, show considerable damage; in many instances they were entirely destroyed. It will require a considerable expenditure to replace these facilities. There has been no real progress made the past ten years in the way of additional tracks, yards, station buildings, etc.

The Aguascalientes shop, ten years ago, would have been considered a modern shop, capable of turning out 25 locomotives per month in classified repairs; the car shops capable of taking care of several hundred cars in heavy repairs. At the present time they are working approximately 2,200 men in both the locomotive and car departments, averaging about 20 locomotives per month and repairing several

THE TRACK conditions compare favorably with much of the track in the United States.

The greatest need is for equipment and rolling stock, the roads having suffered a loss of about 10,000 freight cars and 400 locomotives during the revolutionary period. A considerable amount of passenger traffic is being handled in box cars.

The present railroad administration is up-to-date.

Friendly feeling expressed toward our country.

hundred cars, which is a fairly good output for the plant.

The greatest need of the railways of Mexico is equipment and rolling stock. The lines suffered a loss of about 10,000 freight cars and about 400 locomotives during the revolutionary period. They now have about 350 locomotives awaiting shop, and have a shop capacity of about 75 locomotives per month provided they could get material with which to carry on the work. Labor is plentiful.

There are many hundred remnants of destroyed freight cars. These have all been gathered and assembled at certain convenient points and will be repaired as rapidly as funds can be provided for this class of work. The passenger equipment is in rather deplorable condition, due to lack of repairs during the past ten years, and a large amount of the passenger traffic is being handled in box cars.

One rather unusual thing is the fact that passenger fares in Mexico have not been changed for more than 25 years; however, it is the opinion that the rates will be increased about the first of January. Freight rates, like ours, have increased the past ten years, and they are on a fairly remunerative basis.

Labor organizations in Mexico are well founded. All of the different crafts and classes are organized and have their general chairmen and committees the same as we have them in the United States. Train service employees receive good remuneration. Station and yard employees are also on a good basis. The shop crafts and track laborers, however, have not been so well taken care of, but are on a fair living wage considering conditions and surroundings.

The present railroad administration is up-to-date and composed of practical men. The director general is a man of about 22 years' experience, having been trained in the early days under the leadership of American railroad men, and for the past few years he has been superintendent and general superintendent of part of the National Lines. He appears to be a man well versed in railroad operation. His official staff, in most instances, are apparently capable men, all of them having come up through the ranks. The employees are made up entirely of Mexicans, there being only two or three Americans in railroad service on the entire National Lines system. One of these is a yardmaster by the name of Clark, at Durango, and another is R. E. Comfort, terminal superintendent at Vera Cruz.

As I view the situation the crying need of the Mexican railways is capital for the rehabilitation of the rolling stock and motive power and the expansion of facilities in order to take care of what must necessarily follow a stable government—an increased volume of traffic.

I found a most friendly feeling expressed everywhere for the United States and for the Americans. Peace and quiet prevailed everywhere during the entire trip and the only evidence of revolution to be seen were the scars which have been left behind. I am of the opinion that the present government is the strongest that has been in power since the abdication of the old Diaz regime and with proper support I am confident it will be friendly to the United States and that the railroads of this country can well afford to assist the railroads of Mexico in getting on their feet and in opening their transportation and traffic gateways.

Car Loading Decreases

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week of December 25 was less than for any week in 1920 except one week during the switchmen's strike last April, according to the weekly report of the Car Service Division of the American Railway Association. The total was 639,275, as compared with 684,784 in 1919 and 549,975 in 1918. The heavy reduction as compared with the week before was due to the Christmas holiday but this is also the second week in which the loading has fallen below the total for the corresponding week of 1919. For the week of December 18 the loading was 796,858 cars. The summary of the report follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, DECEMBER 25, 1920

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded: This year 1920	Corresponding year 1919	Corresponding year 1918	Received from connections: This year 1920	Corresponding year 1919	Corresponding year 1918
Eastern	1920	4,609	2,386	46,064	1,446	5,525	1,026	38,297	52,410	151,763	.....	.....	202,174	.....	.....
	1919	5,017	3,111	41,482	3,168	6,020	1,226	29,096	77,974	.....	167,094	140,235	.....	218,629	203,715
Allegheny	1920	2,351	2,807	54,565	6,311	3,062	3,234	31,173	44,928	148,431	.....	.....	112,133	.....	.....
	1919	2,515	3,410	43,428	3,545	3,255	2,228	35,654	50,210	.....	144,245	133,260	.....	112,890	143,205
Pocahontas	1920	81	93	17,255	336	1,404	118	2,092	4,398	25,777	.....	.....	15,095	.....	.....
	1919	89	56	12,919	452	1,574	230	172	6,835	.....	22,327	15,973	.....	16,408	17,015
Southern	1920	2,504	1,696	23,793	710	13,142	1,658	30,166	25,705	99,374	.....	.....	61,631	.....	.....
	1919	2,639	2,232	23,741	118	13,677	1,611	18,289	44,311	.....	106,618	72,265	.....	73,888	55,720
Northwestern	1920	8,659	5,156	7,848	1,328	8,252	1,105	20,894	17,889	71,131	.....	.....	40,313	.....	.....
	1919	10,145	7,700	12,763	728	8,617	1,346	16,958	29,080	.....	87,337	77,463	.....	52,505	58,613
Central Western	1920	8,047	6,741	22,603	316	2,767	1,908	23,499	26,868	92,749	.....	.....	43,379	.....	.....
	1919	9,359	9,476	25,097	313	3,607	2,196	19,251	36,496	.....	105,995	74,935	.....	65,049	49,275
Southwestern	1920	2,896	935	5,180	509	5,162	448	12,797	22,123	50,050	.....	.....	39,638	.....	.....
	1919	3,438	1,777	6,446	512	4,970	489	12,003	21,533	.....	51,168	35,844	.....	49,275	35,059
Total all roads	1920	29,147	19,814	177,308	10,956	39,314	9,497	158,918	194,321	639,275	.....	.....	514,363	.....	.....
	1919	33,202	27,762	165,876	8,836	41,920	9,326	131,423	266,439	.....	684,784	.....	.....	588,644	.....
	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	549,975	.....	.....	562,602
Increase compared	1919	.....	.....	11,432	2,120	.....	171	27,495	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	4,055	7,948	.....	.....	2,606	.....	.....	72,118	45,509	.....	.....	74,281	.....	.....
Increase compared	1918	.....	.....	.....	.....	.....	.....	.....	.....	89,300	.....	.....	.....	.....	.....
Decrease compared	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48,239	.....	.....

L. C. L. merchandise loading figures for 1920 and 1919 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1919. Add merchandise and miscellaneous columns to get a fair comparison.

December 18	....	35,505	30,470	223,153	12,750	48,626	14,127	186,997	245,230	796,858	806,734	796,116	587,099	576,770	672,533
December 11	....	36,820	31,799	230,396	13,904	51,194	17,673	193,143	259,968	834,897	761,940	820,202	614,178	596,785	683,649
December 4	....	37,109	30,903	230,228	15,643	53,971	27,195	195,571	281,542	872,162	789,286	837,806	605,876	589,350	657,758
November 27	....	33,922	29,844	205,985	14,338	50,154	31,445	173,958	258,027	797,673	739,197	735,628	604,966	611,793	641,479

The number of surplus cars continues to increase. For the week of December 23 the total was 127,723, while there were scattering shortages, particularly in the coal fields, of 9,056 cars.

Great Eastern Continental Express

English Railway Developments During 1920

Freight and Passenger Rates Increased—The Minister of Transport Outlines the Future Policy

By Robert E. Thayer
European Editor of the *Railway Age*

LONDON, England, December 10, 1920.

THE YEAR 1920 will stand as the second year of a period of the greatest moment in English railway history. It may logically be compared to the year 1919 for American railways. It has been a period of study and investigation looking forward to a future railway policy which bids fair to upset and wholly revolutionize all English railway traditions. It has been a "Ministry of Transport" year rather than a "railway" year. By that is meant that practically all of the developments that have occurred during the year have emanated from the Ministry of Transport rather than from the railways. This demarkation between the Ministry of Transport and the railways is made advisedly, for, unlike the United States Railroad Administration, the Ministry of Transport has held itself aloof from the direct control of railway operation. It has confined its activities more particularly to a study of the broader phases of the subject and the initiation of general policies while the railway managements have operated the roads.

THE ENGLISH railways have handled more freight and passengers during 1920 than ever before.

The Ministry of Transport has outlined proposals for the future control of the railways which must shortly receive consideration in Parliament. It includes a grouping of the roads, employee representation on the boards, rate fixing machinery, and other provisions which tend toward nationalization, although during the past year the nation rejected railway nationalization.

The development during 1920 may be summed up briefly as follows: The Ministry of Transport has been busy formulating a plan for the future of the railways; it has increased both passenger and freight rates; it has inaugurated a system of statistical reports which are published regularly in four-weekly periods; and it has appointed committees to investigate electrification problems, standardization, automatic train control, complete revision of the rate structure, railway agreements made during the period of government control, etc. According to opinions of a large number of people, it has been making a strong endeavor to establish the Ministry of Transport as a permanent institution in the English government. On the other hand the railways have been carrying on, improving and reconstructing their plant as best they might to bring it back to pre-war conditions. There has been no real development along the lines of capital expenditures because of the uncertainty of the future, the railways naturally holding all new developments in abeyance until a definite railway policy is evolved by the government.

The year has shown an improvement in general railway conditions in the matter of permanent way, rolling stock and improved freight and passenger carrying capacity, for which the railways themselves are primarily responsible. Sir Eric Geddes, minister of

transport, recently said in Parliament that in spite of the depleted resources and various dislocations due to the war, vastly greater freight and passenger traffic has been carried than ever before in the history of the English railways. There was considerable congestion in freight traffic at the beginning of the year, but this has greatly improved, until now the congestion is not bad enough to warrant wholesale criticism in the press, as at the beginning of the year.

Discussion of Future Problems

By far the most interesting development during the year has been the discussion of the future railway policy to be adopted by the government. The Ministry of Transport published not long ago a brief report outlining proposals as to the future organization of transport undertakings in Great Britain. This has been taken as defining the policy the government is to follow in its presentation of a final transport bill to the English Parliament within the next few weeks. The proposal is: to group the roads; to provide for each group a board of management, in which the representatives of labor shall participate; to prescribe rates with a provision for government participation of profits above a certain net return on those rates; to provide a method of handling all rate questions; to provide a method of handling wages and working conditions, and to increase further the powers of the state in relation to the railways.

Grouping—It is proposed to group the railways into seven distinct groups. The method suggested in this instance is geographic rather than economic, there being a Southern, Western, Northwestern, Eastern, Northeastern, London, and Scottish group. It is proposed that all the railways included in each of these sections of the country shall be amalgamated under one group management. Since this report has been issued there has been a severe criticism of the geographic arrangement. It would entirely eliminate all competition except possibly along the boundaries of the groups. By placing all the Scottish railways in one group it is claimed they would be bankrupt under the rates and labor conditions prevailing at this time. With wages standardized, the wage bill of the Scottish railways has been increased in much greater proportion to the increase in revenue to be derived from the increase in freight and passenger rates than the English roads. The Scottish railways claim that they could not live under such conditions. Furthermore, the public, particularly the shippers, is not ready to eliminate competition entirely.

Substitute proposals have, therefore, been brought forward from various sources based upon economic considerations, and which serve to retain a competition which it is quite agreed must exist if railway transportation is to progress. In these counter proposals a north and south grouping has been suggested, amalgamating certain of the Scottish lines with certain of the English lines so that there would at least be two competitive groups running from the south of England to the north of Scotland.

Management—The Ministry's proposals outline a board of management for each of the above-mentioned groups, to consist of 21 members, of which the shareholders should be in the majority and the rest divided, one-third being administrative officers of the group, and two-thirds representatives of the workmen. The railway stockholders have evinced much opposition to this proposal, claiming that employee representation on management councils is one thing, but on a directors' board entirely different. This point will be strongly contested when the final bill is presented to Parliament.

Finance—The Ministry's proposal in regard to finances is that rates and fares shall be fixed at such a level as, with sufficient and economical management, will, in the opinion of a prescribed authority, enable railway companies to earn a net revenue substantially equivalent, on some pre-war basis, to the combined net revenue of all the companies absorbed in the group. Further, it is stated that in case the pre-war return of the railways in the new groups is exceeded the state should participate in such surplus revenues, which should be used for the purpose of assisting the backward districts in developing their transportation system, to developing small railways, and for other appropriate purposes in connection with transportation.

Rate Fixing Machinery—It is generally admitted that the basis on which the existing railway rates and charges are fixed is quite unsatisfactory and that it does not meet present conditions. The Ministry is now reviewing the situation and plans are in progress for bringing the whole rate question up-to-date. In the contemplated legislation the Ministry proposes to establish a body similar to the present Rates Advisory Committee, to consider all rate questions. The Ministry does not propose to include any guaranteed financial assistance to the railways in the future but proposes to regulate the railways' income through this rate-making body. In case the railways should not accept any decision of the rate-making body, it is proposed to grant them the right of appeal to a judicial tribunal.

Wages and Working Conditions.—In this preliminary report the Ministry states that it is the intention to continue the arrangement now in effect for dealing with railway wages and conditions, namely, that two boards shall be established, the Central Wages Board, consisting of equal numbers of managers and men, and the National Wages Board, consisting of four managers, four representatives of the men and four representatives from the users of the railways, with an impartial chairman. The latter board is to act as a board of last resort. In the case of a request for an advance in wages of the railwaymen during May of the past year, the National Wages Board was called into action and served its purpose admirably.

Powers of the State.—The Ministry outlined certain state powers which should be included in the final railway bill which may be classified as follows:

(a) The protection of the public.
(b) The economical working of the railway systems of the country.
(c) Safeguarding national interests.

Under the first heading the state would be given power to require adequate service and facilities and minor extensions wherever it was deemed necessary. However, the group affected by such demands would be given the right to appeal to a prescribed tribunal in case such demands would seriously interfere with its finances. Likewise it is planned to give the state, under the same right of appeal, power to require alterations, improvements, and additions necessary for public safety.

Under the second heading it is planned to give the state the power to impose standards, granting the right of appeal to the companies. The state also would have the right to require co-operative operation, common use of rolling stock and facilities, pooling of traffic and receipts where competition caused waste, and the common use of repair and manufacturing facilities. Furthermore, it is claimed under this head that the government should have the full power to prescribe the form of accounts and to require compilation of such statistics and returns as are deemed necessary.

Criticism of the Ministry's Plans

Under the third item, the railways would be required to submit for approval to the government their proposals involving capital expenditures and their plans for raising the capital required, with further power to require adequate reserves for depreciation and renewals before dividends are declared. This also would be subject to a right of appeal by the railway companies.

The above outline of what the Ministry proposes the gov-

ernment should do was published during the summer. Needless to say it has been given the closest and most careful consideration, not only by the railways, but by the industrial interests. The railways, through the Railway Companies' Association, have but just published their criticism of the proposed plans. An abstract giving the general trend of this criticism, which is addressed to the Minister of Transport, is given below:

The railways feel that if the government is to insist upon grouping the railways the principal considerations should be the securing of financial equilibrium within each group. The plan outlined by the Ministry they believe will not achieve this object and they submit an alternative scheme of five groups in contrast to the Ministry's seven groups. The railway companies approve of the Western, Southern and the London groups, as defined by the Ministry, but suggest dividing the Scottish group so that the Caledonian, Glasgow & South Western and the Highland would be included in the government's proposed North-Western group, and that the North British (Scotland) and the Great North of Scotland should be included in a single group with the Ministry's Eastern and North Eastern groups. This gives two competitive groups from London to the North of Scotland. The companies believe that economy will result from a suitable scheme of grouping but not to the extent contemplated by the Ministry. They believe the amalgamation of capital in these groups should be optional and not compulsory; that the "worked lines" should be acquired by the working companies or the groups of companies either on a perpetual lease or by purchase, and that there necessarily would have to be a rearrangement as to joint lines now operated by railroads which would come in the different groups.

The railways will strenuously oppose any suggestion that "workers elected by the workers" shall be appointed to the boards, believing that it is wrong in principle, that it would greatly disrupt discipline and furthermore that it is entirely wrong for the government to insist on any such plan which would interfere with the right of the shareholders to choose their own directors while it, the government, refuses to accept any financial responsibility. The railways quite agree, however, that advantage is to be obtained by some association of the workers with consideration of operating problems, but these should be in the nature of committees to meet under the chairmanship of a director to consider and make recommendations to the board.

In commenting on the Ministry's proposals under the head of finance and rate fixing machinery, the railways call attention to the ambiguity of the government's proposal of fixing rates and fares so that the net revenue substantially equivalent to some prewar basis is to be earned, stating that if the rate of return on capital is not to exceed the prewar rate it would be impossible, on any reasonable terms, to procure additional capital, but if it is proposed to consider net revenue on railway investments in the same relation to other industrial investments as in prewar days it would be a different matter. The railways dispute the ground upon which the state could claim participation in any surplus revenue earned by the railways and protest further that the state is not justified in claiming participation in surplus profits when it will accept no responsibility in respect to loss of revenue due to circumstances over which the railways have no control.

Furthermore, as the railways believe that any bill the Ministry may choose to place before the Parliament cannot become a law at the earliest until June or July, 1921, and that so many serious problems will arise as a result of it, they advocate that grouping should not be compulsory before the beginning of the year 1924. In the meantime the railways propose that the government should continue the present financial agreement and guarantee to the railways the 1913 net receipts. As regards rates the railways strongly object to the Minister of Transport having the right to refuse an advance in rates, and claim that the object in view can be secured if the Minister is to have the right to appear before the "rate-fixing tribunal" proposed by the government, for the purpose of challenging the careful and economical management of the railways seeking the increase in rates.

As regards wages and working conditions, the railways oppose the Minister's proposal to continue the Central Wages Board and the National Wages Board with the powers they now hold, as it takes from the railways the power of dealing with their own men and for setting up their own machinery for settling disputes. It would also tend to establish as a permanent arrangement the standardization of wages and conditions of service without taking into consideration the different conditions that apply to different parts of the country, which in the opinion of the railways is wrong in principle and uneconomic in practice. In lieu of the Ministry's proposal, the railways suggest the system of Conciliation Scheme Boards which were first established in 1907.

In criticizing the Ministry's proposals regarding the powers of the state, the railways say they will oppose to the utmost any such conditions as enumerated by the Ministry. For the state to have power to require adequate service and facilities and minor extensions, the railways say, would be entirely inconsistent with the principle of private management and the responsibility for capital expenditure. For the state to impose standards is likewise incompatible with lack of responsibility for expenditure on the part of the state. Furthermore, by grouping the railways, standardization will tend automatically to take care of itself. As regards the form of accounts, the railways believe that if the government desires anything different from that already compiled for the shareholders of the railways, the cost of preparing such information should be charged to the state. Regarding state approval of capital expenditures, the railroads feel that this would take away from the boards the control of finance and they strongly object to this proposal. They agree, however, that the state should have the right to demand information regarding depreciation and renewal funds in order to assist the rate-fixing tribunal in establishing adequate rates.

The Shippers' Viewpoint

The industrial interests also have had something to say regarding the Ministry's plans. The Association of British Chambers of Commerce and the Federation of British Industries have been the leaders in this criticism. The Association of British Chambers of Commerce has adopted and forwarded to the Minister of Transport a report drawn up by a special committee appointed by the association to consider the proposals. As an indication of how the British industries feel a brief abstract of this report is given below:

While the committee welcomed the statement that the Minister of Transport and the government are opposed to nationalization of the railways, it regards the proposals outlined by the Minister as possessing many of the defects of nationalization without the responsibilities of the state which would attach to actual nationalization. It believes that the future powers in relation to railways should be vested in a body not liable to be influenced by political considerations. It advocates replacing the functions of the Ministry of Transport by a joint railway authority on which all interests might be represented.

As regards the grouping scheme, the committee believes that it will result in increased charges for both passenger and freight owing to the entire elimination of competition in any particular district, and while it agrees to the beneficial effect of grouping, such grouping should not be allowed to result in the elimination of competition.

The committee is opposed to the joint management committee as outlined, believing that these boards should be elected by the owners of the railways in the ordinary way. The committee does not question, however, but what representatives of the workers could work to good advantage on advisory committees in regard to the efficient and economical working of the railways, such committees being subordinate to the joint management committees.

It is believed that difficulty would be encountered in raising capital if the spending of such capital came under the jurisdiction of a board not made up entirely of men directly responsible to the providers of that capital. The committee states that the railways should be left to work out their own salvation in raising capital, sufficient opportunity being given to them to earn profits which will produce a satisfactory return to the investing public, and it deprecates any scheme of government loans for the capital requirements of the companies.

By placing the development of railways under the control

of the government, as outlined above, the committee believes that it would probably lead to the use of political pressure, which purely on economic grounds would not be justified.

In commenting on the manner in which the Ministry proposes to handle wages and working conditions, the committee calls attention to the fact that economic conditions of the country must determine the wages and conditions of employment of all workmen, and any permanent machinery which may be provided must not be for the purpose of attempting to circumvent the operation of economic law. It believes that the National Wages Board as now constituted should be regarded as only a temporary expedient to meet an emergency.

As regards the future powers of the state, the committee believes that the prewar control exercised by Parliament through the Board of Trade amply protected the public and that economical working of the railway systems might well be left to the companies of the groups themselves. Likewise standardization should be considered and provided for by the groups.

Labor Promises "Big Fight"

Labor has not been standing passively by while industry expressed its views on the Ministry's proposed joint management scheme. Within the past few weeks J. H. Thomas, the real leader of the railwaymen, made a strong statement in which a "big fight" is promised should the government not grant labor representation in railway management. Labor has, in the plans issued by the Ministry, a strong ground to stand on.

It will thus be seen that while the past year has had its interesting features, the new year will possibly far surpass it in interest and excitement. To prepare the public for the final introduction of a plan for the future organization of the railways, the Ministry of Transport has been doing a rather extended amount of propaganda work. The daily newspapers have been used to a great extent and as this article is being written a series of unsigned articles entitled "The Future of British Railways" is being published in one of the principal morning papers, the context of which leaves no question of a doubt as to its coming directly from the Ministry of Transport. Throughout the year the Ministry has not neglected many opportunities for free advertising.

The railway owners, on the other hand, have held aloof from following in its steps. The atmosphere at present is far from being pleasant and the railway owners, and also the railway managements, are not nearly so enthusiastic about the Ministry of Transport as they were when the ministry was formed 18 months ago.

Financial Standing of the Railways

From the time the government took over the railways, five days after the beginning of the war, and up to the end of 1918, there was a profit shown to the government in receipts over expenditures after all dividend guarantees had been paid, but during that time there had been gradually accumulating a bill for deferred maintenance under the various agreements made between the government and the railways. During the past two years some attempts have been made to write this off the books. In 1919 a total of £60,000,000 was provided to meet the demands of these agreements, and for the year 1920-21 the budget called for £22,000,000 for arrears on maintenance and renewal of works and for interest on capital expenditures. This, however, does not represent the full amount that must be paid by the government to the railways, for, under the agreements, the government must turn the roads back to their owners with the same amount of material, or its equivalent in cash under present-day prices, in accordance with the inventory that was taken at the time the government first took over the roads. A committee is now working on this complicated problem, and, while no definite statement has been made, it is estimated that a large amount of money is involved.

The report recently issued by the Ministry of Transport shows how the railway budget has changed, considering a full normal year under present conditions, in comparison with the pre-war year of 1913. This comparison is shown in Table I, and it will be noted that the expenditure has increased 236 per cent. According to these figures, the sources of revenue bear practically the same proportion to each other for both periods, but it will be noted that there is a vast difference in the proportions on the expenditure side. Labor, in 1913, represented 34.8 per cent of the total railway expenditure. For a full normal year, under present conditions, labor's proportion is 51.5 per cent, an increase of 48 per cent over its proportion in 1913. Likewise, attention should be called to the large decrease in interest on capital.

TABLE I—A COMPARISON OF THE RECEIPTS AND EXPENDITURES ON BRITISH RAILWAYS FOR A FULL NORMAL YEAR UNDER PRESENT CONDITIONS AND THE YEAR 1913

Receipts

	1913		Under existing conditions	
	Amount in Pounds Sterling	Percentage of total	Amount in Pounds Sterling	Percentage of total
Passengers	44,000,000	32.6	105,000,000	33.0
Parcels and freight	78,000,000	57.7	188,000,000	59.2
Other sources	13,000,000	9.7	25,000,000	7.8
Total	135,000,000	100.0	318,000,000	100.0

Expenditure

	1913		Under existing conditions	
	Amount in Pounds Sterling	Percentage of total	Amount in Pounds Sterling	Percentage of total
Labor	47,000,000	34.8	164,000,000	51.5
Coal stores and materials	33,000,000	24.5	92,000,000	29.0
Sundries	8,000,000	5.9	14,000,000	4.4
Total working expense	88,000,000	65.2	270,000,000	84.9
Interest on capital	47,000,000	34.8	48,000,000	15.1
Total	135,000,000	100.0	318,000,000	100.0

Note—The figures for the year 1913 are actual (approximately), but those shown as "Under Existing Conditions" are necessarily estimated. The sum total, £318,000,000, is that sum which must be obtained to avoid a loss which would fall upon the taxpayer.

In anticipation of returning the roads to their private owners next August, when the term of the Ministry of Transport expires under the Transport Act, the Ministry has resorted to a unique arrangement in an endeavor to turn back the roads with all deficits wiped out. It so increased passenger and freight rates during the past year, as not only to cover operating expenses up to August 15, 1921, but also to absorb all previous deficits, the intention being that by that time the Rates Advisory Committee would have had sufficient time to formulate a new system of rates which would provide sufficient revenue to meet the current expenses and provide an adequate return on capital invested. The Ministry's estimates have been quite upset, due to the recent coal strike, which resulted, according to the Minister of Transport, in an estimated loss of £8,000,000, and which will have to be absorbed by the government, inasmuch as the rates are not sufficient to cover this added loss.

What the real financial condition of the roads will be when the government turns them back (if it does) it is impossible to predict at the present moment, as much will depend upon the legislation that is passed by Parliament. But what the British public thinks of the railways as an investment, and the confidence it has in the government to return them to the owners on a sound financial basis, is reflected to some extent in the present prices of railway stocks. Table II is shown comparing the high and low values of certain railway securities in 1913, with the average value of the same securities on December 6, 1920. A casual glance at this table will show that the 1920 value is more than 50 per cent under the high quotation in 1913, and, furthermore, the investing public has less confidence in the Scotch companies than in the English companies.

Passenger and Freight Rates Increased

During the past year there have been two increases in freight rates and one in passenger fares. The freight rates were increased, for the first time since the beginning of the war, on January 15, 1920, an average of 50 per cent being applied to existing rates on all classes of minerals and merchandise with the exception of manures, basic slag and lime for agricultural uses. This was applied to cover an estimated annual deficit of £50,000,000. This increase included also an increase in rates on parcels and freight carried by passenger train.

On further investigation it was found that the additional revenue derived from this increase of rates was not sufficient to offset the heavy deficits which were constantly increasing. On August 16, 1920, a general increase of 16 2/3 per cent on the then existing passenger fares was made which, together with a 50 per cent increase in passenger fares applied on January 1, 1917, brought the total increase up to 75 per cent of the pre-war rates. On September 1, last, another increase in freight rates was made, bringing the total increase in freight rates up to approximately 100 per cent of pre-war rates. As has been stated, these increases were made, not only to cover current expenses, but to wipe out any deficit that might apply on August 15, 1921, when the term of the present Ministry of Transport will terminate.

TABLE II—COMPARISON OF HIGH AND LOW VALUE OF RAILWAY STOCKS IN 1913 WITH THE AVERAGE VALUE ON DECEMBER 6, 1920, OF SOME OF THE PRINCIPAL BRITISH RAILWAYS

	1913	1920	Percentage decrease*
Caledonian—			
Ordinary stock	79½— 70	36½	54
Deferred converted	21¾— 17¼	7¾	64
Preferred converted	59¼— 53½	28¾	51.5
Glasgow & South Western—			
Deferred ordinary	44½— 40½	21¼	51.5
Great Central—			
Deferred ordinary	17⅛— 14⅛	5½	68
Preferred ordinary	39⅜— 31½	10½	73.5
Great Eastern	63½— 44⅝	30	53
Great Northern—			
Deferred	57¼— 49½	28¾	50
Preferred	88¾— 79¼	44½	50
Great Western	119¾—112	74¾	37.5
Lancashire & Yorkshire	91½— 82¾	53	42
London, Brighton & So. Coast	95 — 86⅜	44½	53
London & North Western	136¾—125¾	75¼	45
London & South Western	39⅞— 33½	20¾	48
Midland—			
Deferred	77⅛— 70	48	38
Preferred	60⅜— 56¾	33	45
North British	32⅞— 26¾	12	63.5
North Eastern	124—116½	78½	37

* The 1920 value is compared with the high value in 1913.
Note—The average decline in all of the above is 51¼ per cent, and for the three Scottish companies alone is 56.9 per cent.

These increases in both freight rates and passenger fares are intended only as a makeshift, and the Rates Advisory Committee, which was appointed by the Ministry of Transport, has since been making a thorough investigation of the entire rate problem for the purpose of establishing an absolutely new rate structure. The existing rates in effect on the British railways represent a gradual development from a rate basis established years ago, and it has been thought advisable to go over the whole matter with the idea of removing all anomalies and establishing an absolutely new set of rates to meet the present changed conditions in the commercial life of the country. The Rates Advisory Committee has been holding hearings, calling as witnesses representatives from both the railway and commercial interests. Its report will probably be made during 1921, at a time before the roads are returned to their owners.

The present passenger fares vary anywhere from 5.4 cents to 6.45 cents per mile for first-class passengers, and from 3.11 cents to 3.58 cents for third-class passengers, the transition from pence to cents being based on 1d equals 2 cents. Statistics are not available to show the average revenue received per ton-mile for the latest increase in freight rates.

The Rates Advisory Committee, in its report on the increase of passenger fares, believed that it was feasible to grant some excursion rates, regardless of the fact that passenger traveling throughout Great Britain had increased materially over 1913 at the ordinary fares. In response to the suggestion of the committee third class excursions were inaugurated over the week-ends on certain lines during the summer months, in which the round trip was made for the price of a single fare. These reduced fares were restricted to special excursion trains. More recently third-class excursion fares were granted over the Christmas holidays. These excursion fares were permitted on regular trains but were granted only on trips of 100 miles or more at round-trip fares, equivalent to one and one-third times the one-way fare. The Ministry of Transport gave as the reason for restricting these excursion fares to trips of 100 miles or more, that the shorter trips would be made anyway, and a concession was given on the longer trips in an endeavor to induce travel.

Reference was made in the preceding paragraph to the increase in passenger traffic over 1913. Figures presented by Sir Herbert Walker, general manager of the London & South Western, to the Rates Advisory Committee, showed that 1,066,000,000 passengers traveled on the controlled railways at ordinary fares in 1919, as against 818,000,000 traveling at ordinary and excursion fares in 1913; passengers traveling at workmen's fares increased from 255,000,000 in 1913, to 411,900,000 in 1919, and the number of season tickets increased during the same period from 569,310 to 901,082.

At the beginning of the year when freight congestion was very bad, an attempt was made to relieve the situation by increasing the demurrage rates. Before this increase was put into effect, the demurrage rates were the same for each day the cars were held out of service. The new rates doubled the old rates for the first two days and trebled the old rates for each subsequent day. It was expected that this would relieve the situation, but the records of the following months showed that it did not have as great an effect as desired. The following table gives an indication of the results obtained, the percentage shown being the percentage decrease in the number of cars held in demurrage as compared with December, 1919, the month before the increase in demurrage rates went into effect:

January .....27 per cent decrease	June .....21 per cent decrease
February ....39 per cent decrease	July .....26 per cent decrease
March .....37 per cent decrease	August .....17 per cent decrease
April .....34 per cent decrease	September ....24 per cent decrease
May .....29 per cent decrease	

One reason why the railways did not benefit to a greater extent on the increased demurrage rates is because of the fact that about one-half of all the freight cars in Great Britain are not railway owned cars. Before the Transportation Act of 1919 went into effect the Minister of Transport strongly advocated the railways taking over these privately owned freight cars, but because of the great opposition raised by the industries owning them, nothing has been done as yet in this respect.

Labor Conditions

The labor conditions were mild in 1920 as compared to 1918. There were a few isolated strikes, barely worth mentioning, which were promptly settled. The reason for the lack of any large amount of disturbance is that railway labor was receiving the benefits of the settlement of the 1919 strike, and the machinery in the form of wage committees set up as a result of the 1919 strike.

In two particular cases there were grave threatenings of disorder. One was in the early summer when the men presented their demand for a blanket increase of £1 a week, and again in October, when a sympathetic strike was threatened to assist the miners in obtaining their demands. In the first case the trouble was overcome by a thorough investi-

gation of the railwaymen's claims by the National Wages Board, which is made up of 13 members, four of which represent the railways, four the railwaymen, four the users of the railways, and an independent chairman. In the second case the sympathetic strike was headed off by the good judgment of the union leaders, although for a time it appeared that the extremists had control. Had not a settlement been reached with the miners at the time it was, there undoubtedly would have been a railway strike.

The railwaymen at the beginning of the year succeeded in getting the wages in the different grades standardized throughout the country. As an indication of how the standard rates are applied, the following figures, showing the standard rates in shillings per week of freight handlers, or "goods porters," as they are called, are given:

Location	Pre-War Rates	Jan. 1920 Rates	Minimum Rates
London	20s. to 24s.	61s.	47s.
Other large towns	20s. to 26s.	60s.	46s.
Small towns	20s.	57s.	40s.

Note:—The January, 1920, rates give the weekly wages of these men at that time with the stipulated increased cost of living adjustment. The minimum rates show the limit to which the weekly wage of these men can fall regardless of the cost of living.

It may be said in passing that this standardization in wages has presented a serious problem for the Scottish railways, where traffic is very much smaller than on the strictly English roads.

The hearings before the National Wages Board on the demand of the railwaymen for the blanket increase of £1 per week applied to all members of the union with the exception of the shopmen, whose claims were handled in the Industrial Court. This new demand was not based on the cost of living, and was considered by the railwaymen wholly apart from settlement of their wages as a result of the September, 1919, strike. Their claim for the £1 a week increase was based on a comparison with wages paid in other industries. The hearing lasted for a little less than a month, in May and June. The award granted varied from four to seven shillings on the part of the enginemen in contrast to the twenty shillings, or £1, demanded, and from 2½ shillings to 7½ shillings for the railway workers of other grades. The smallness of the award as compared to the demand, speaks well for the work of the National Wages Board.

During the past year there has been an interesting development of the "eight-hour day." It seems that the railwaymen have been seeking to fill in their spare time outside of their prescribed eight hours' work on the railway by seeking outside jobs. The matter came to such a pass that C. T. Cramp, president of the National Union of Railwaymen, found it necessary to address a letter to the members of the union calling attention to the fact that the Agricultural Laborers' Union and the British Gardeners' Association had filed complaints with the N. U. R. to the effect that the railwaymen, after finishing their railway duties, were encroaching upon their fields of activities with detrimental effect to the men in those lines of occupation. Nor were the railwaymen restricting their field to agricultural employment; some of them were filling in their spare time as musicians, painters, etc.

Mr. Cramp says: "It will be apparent that this union (National Union of Railwaymen) did not fight for and obtain the eight-hour day for railwaymen in order that they should find spare time employment and so prevent other men from obtaining a living."

J. H. Thomas, member of Parliament and secretary of the National Union of Railwaymen, in a talk before the International Transport Federation, recently convened in London, predicts a "big fight" in the next few months over a new stand that the railwaymen are going to make. He said: "We have fought for hours and wages, and we have succeeded in reducing our hours and increasing our wages, but we still believe that the workers' part in life ought not to be that of hewers of wood and drawers of water. We believe that we can contribute something to efficient railway management." Mr. Thomas referred to the bill which will shortly be put forward in Parliament on the future railway policy. He gives warning that the railwaymen will fight hard for participation in any board formed for the control of the railways in the final scheme adopted. In this he has received encouragement from the Minister of Transport through a published outline of what the government believes is a solution of the railway problem, in which it is stated that:

> The Board of Management should, in the opinion of the government, be composed of representatives—
>
> (a) of the shareholders, who should form a majority on the board, and of whom a proportion should hold large trading interests;
>
> (b) of employees, of whom one-third might be leading administrative officials of the group, to be co-opted by the rest of the board, and two-thirds members elected from and by the workers on the railway.

With encouragement of this sort coming from the Minister of Transport, there is not much likelihood of the railwaymen allowing such an opportunity to pass without a fight, irrespective of how unpalatable such an arrangement might be to the real owners of the railways.

Statistics

One of the first things the Minister of Transport did after assuming office was to set to work towards establishing a uniform method for the compilation of statistics for the various roads throughout the country. The first of these was published in February, containing statistical information for the four weeks ending February 1. These all applied to freight. Beginning with the first of July a modified table of passenger statistics was included in the report.

These statistics do not include any information regarding the expenses of the railways. They deal primarily with the amount of freight handled under various classified items used in the rate schedule; classified information on engine hours and engine miles; average length of haul; receipts classified under the principal commodities and per ton-mile; average train load, train hours, train miles, and train miles per train

TABLE III—FREIGHT STATISTICS PUBLISHED BY THE MINISTRY IN FOUR-WEEKLY PERIODS

	Ending Feb. 1, 1920	Ending Feb. 29, 1920	Ending March 28, 1920	Ending April 25, 1920	Ending May 23, 1920	Ending June 20, 1920	Ending July 18, 1920	Ending Aug. 15, 1920	Ending Sept. 12, 1920
Net ton miles—revenue freight (millions)	1.487	1,511	1,546	1,381	1,523	1,430	1,507	1,348	1,489
Average length of haul (miles)	56.60	56.99	58.04	57.98	58.03	58.50	58.60	58.56	58.31
Gross freight train receipts per ton-mile (pence)	1.286	1.618	1.653	1.715	1.57	1.657	1.581	1.706	1.848
Gross freight train receipts (less cost of collection and delivery) (pence)	1.164	1.485	1.529	1.576	1.441	1.517	1.441	1.553	1.709
Average train load (tons)	134	134.80	135.94	132.69	135.66	132.84	134.56	130.33	134.32
Net ton-miles per engine hour	410.02	412.37	423.54	423.78	437.09	438.69	445.47	429.89	436.82
Percentage loaded car miles	71.38	71.09	70.89	70.85	70.52	70.38	69.77	69.11	70.47
Average freight car load (tons)	5.51	5.46	5.48	5.44	5.50	5.40	5.47	5.41	5.38
Cars per train	34.03	34.58	35	34.48	35.01	34.95	35.28	34.91	35.48
Average time per day cars in transit (hours)	1.45	1.51	1.49	1.28	1.39	1.28	1.34	1.22	1.36

Note—A "ton" is equal to 2,240 lb. A "pence" is equal to approximately 2 cents.

and engine hour; average car load; car miles loaded and empty; car miles per engine hour; car miles per car; average time cars are in transit, switching, etc., and the number of cars per train.

The publication of these statistics has been an absolutely new departure in British railway history and their presentation has not been attended with any great amount of enthusiasm on the part of the railways themselves, which claim that the clerical effort involved to produce them has added about £1,000,000 to railway expenditure. Some of the more important statistics included in these reports ars shown in Table III by the four-weekly periods. It will be noted that for the four weeks ending September 12, during which period the last freight rate increase was put into effect, the receipts per ton-mile showed some increase. There has been a gradual increase in the net tons per engine hour, but as regards the other important items, but little improvement has been shown.

TABLE IV—PASSENGER STATISTICS FOR JULY AND AUGUST

	Number Passenger journeys		Receipts Gross (pounds)		Per pass. journey (pence)	
	August	July	August	July	August	July
1st Class..	2,899,747	3,604,047	803,406	936,229	66.49	62.35
2d Class..	585,409	613,395	95,791	96,318	39.27	37.69
3d Class..	143,959,629	148,222,034	9,225,814	9,181,901	15.38	14.87
Total ..	147,444,785	152,439,476	10,125,011	10,214,448	16.48	16.08

Table IV contains passenger statistics for the months of July and August, which are those that have thus far been made public.

Conclusions

Within the next few months it is anticipated that English railway problems will be at least defined by law if not completely settled. The past year has been a year of probation; the nation has rejected nationalization as such but the government seems to have chosen a policy with nationalistic tendencies. If the proposals submitted by the Minister of Transport are approved by Parliament, Great Britain will have added to its official family another department which will materially add to the overhead of government administration. The disposition of the English public at the present time is very much opposed to any additional government expenditure, and with this disposition so readily expressed as it has been recently, both in Parliament and out, it is extremely difficult to predict just what the nature of the final outcome will be.

Section 10 of Clayton Law Effective

WASHINGTON, D. C.

SECTION 10 of the Clayton act, which became a law on October 15, 1914, but which has been rendered inoperative because of various extensions of the effective date, went into effect on January 1 because President Wilson vetoed a bill passed by Congress to amend Section 501 of the transportation act by extending the effective date of Section 10 of the Clayton act for another year.

A substitute for Section 10 of the Clayton act designed to accomplish the same purpose but in a workable way, drafted by Alfred P. Thom, general counsel of the Association of Railway Executives, has been introduced in Congress by Senator Frelinghuysen and Representative Esch, and it has been planned to hold hearings on the bill. The action of the President in vetoing the extension will probably hasten action on the substitute. Section 10 provides that carriers shall not have dealings in securities, supplies or other articles of commerce or make contracts for construction and maintenance to the amount of more than $50,000 in the aggregate in any one year, with another corporation, firm, partnership or association when the common carrier shall have upon its board of directors or as its president, manager or as its purchasing or selling officer or agent in the particular transaction, any person who is at the same time a director, manager or selling officer of, or who has any substantial interest in, such other corporation, firm, partnership or association, unless such dealings shall be with the bidder whose bid is the most favorable, to be ascertained by competitive bidding under regulations to be prescribed by rule or otherwise by the Interstate Commerce Commission. The Interstate Commerce Commission has prescribed regulations in accordance with the law, which have been suspended from time to time, but which went into effect when the law was made effective by the President's veto of the amendment to Section 501 of Transportation Act.

The Interstate Commerce Commission had submitted a report to the President by which the majority of the members of the Commission approved the extension but four members did not.

The President in his veto message pointed out that the Clayton anti-trust act was responsive to recommendations which he had made to Congress and that one of his recommendations in particular was reflected in Section 10. Continuing, the President said in part:

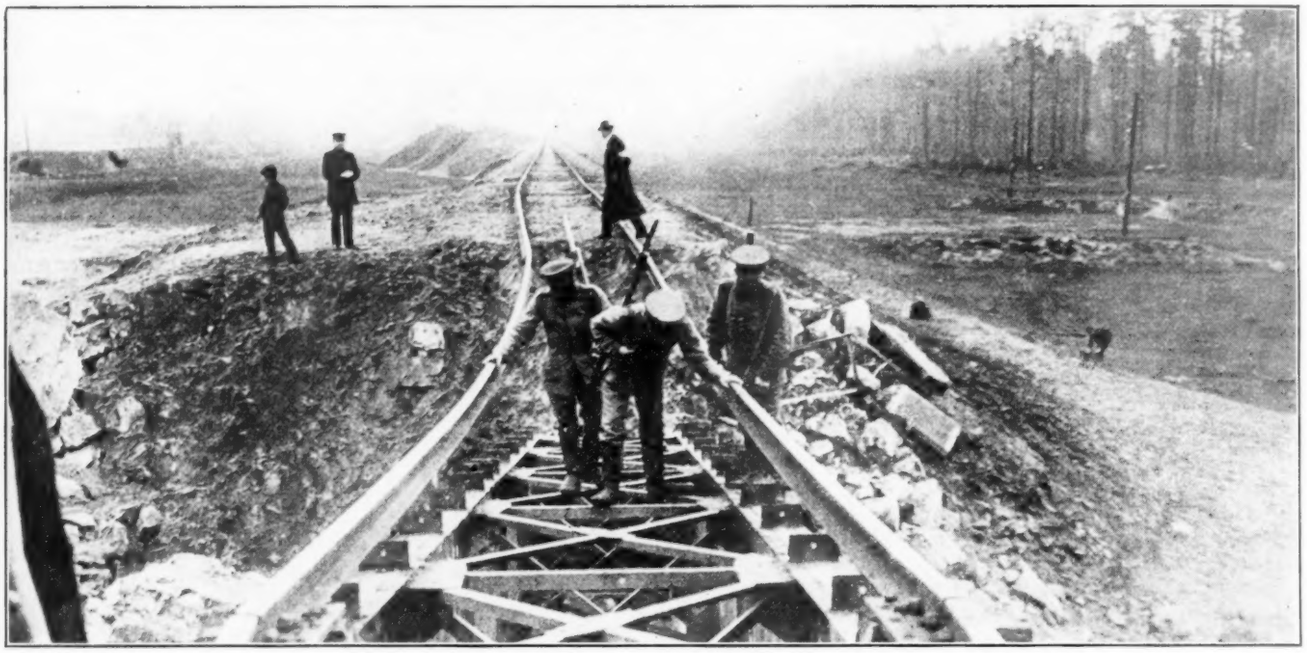
"The act became law on October 15, 1914, and it was provided that Section 10 should not become effective until two years after that date, in order that the carriers and others affected might be able to adjust their affairs so that no inconvenience or confusion might result from the enforcement of its provisions. Further extensions of time, amounting in all to more than four years and two months have since been made. These were in part due to the intervention of federal control, but 10 months have now elapsed since the resumption of private operation. In all, over six years have elapsed since this enactment was put upon the statute book, so that all interests concerned have had long and ample notice of the obligations it imposes.

"The Interstate Commerce Commission has adopted rules responsive to the requirements of Section 10. In deferring the effective date of Section 10, the Congress has excepted corporations organized after January 12, 1918, and as to such corporations the commission's rules are now in effect. Therefore, it appears that the necessary preliminary steps have long since been taken to put Section 10 into effect, and the practical question now to be decided is whether the partial application of those rules shall be continued until January 1, 1922, or whether their application shall now become general, thus bringing under them all common carriers engaged in commerce, and at last giving full effect to this important feature of the act of October 15, 1914.

"The grounds upon which further extension of time is asked, in addition to the six years and more that have already elapsed, have been stated as follows:

> That the carrying into effect of the existing provisions of Section 10 will result in needless expenditures on the part of carriers in many instances; that some of its provisions are unworkable, and that the changed status of the carriers and the enactment of the transportation act require a revision of Section 10 in order to make it consistent with provisions of the transportation act.

"When it is considered that the Congress is now in session and can readily adopt suitable amendments if they shall be found to be necessary, such reasons for further delay appear to me to be inadequate. The soundness of the principle embodied in Section 10 appears to be generally admitted. The wholesome effects which its application was intended to produce should no longer be withheld from the public and from the common carriers immediately concerned, for whose protection it was particularly designed."



Repairing a Railroad in Northern France

Present Condition of the French Railways

Huge Deficits Have Accrued and Labor Troubles, Including the 8-Hour Day, Have Greatly Retarded Reconstruction

By M. Peschaud
Secretary, Paris-Orleans, Paris, France

THE PRESENT MILEAGE of the French railways is in round numbers about 26,500 miles. This is divided into seven systems, five of which, the Paris-Orleans, the Paris, Lyons & Mediterranean, the Nord, the Est and the Midi, are operated by private companies under state concessions which expire between 1950 and 1960, at which time these railways, under the terms of the concessions, will revert back to the state. The other two systems are known as the State system, founded in 1878 and extended in 1908 by the repurchase of the Ouest railway which has a mileage of about 6,000 miles, and, since the end of the war, the Alsace-Lorraine system which is also worked by the State.

The war put a severe strain on the French railways which I have tried to define in my work "Les Chemins de Fer Pendant et Depuis la Guerre" (Railways During and Since the War).* At the outbreak of the war the financial position of the railways was not bad. The privately operated companies had on an average a surplus while the state operated roads had a large deficit. From both a physical and moral standpoint the railways were in a satisfactory condition, but the war has accentuated more than ever before the principal defects in the French railway system. The roads all converge on Paris, they are not properly equipped to handle cross country traffic and are too independent, physically of one another. However, it is to be said that the war found the railways in a good state of repair and with a well trained working force in which the "esprit de corps," was excellent and, as history has proved, they were a powerful aid to the country in winning the war.

THE TOTAL DEFICIT for all the French railways for 1920 will be about $900,000,000, the operating ratio during the year being in the neighborhood of 125 per cent.

The total number of employees has increasd from 355,900 in January, 1914, to about 500,000; the amount of money paid out in wages meanwhile has increased 327 per cent.

The greater part of the railways destroyed in northern France have been reconstructed and are now in operation.

Effect of the War on Finances

The war necessarily has had a very bad effect on the financial position of the French railroads. The operating expenses increased in a much larger proportion than the receipts. The operating expenses in 1919 were 461,902,000 fr. ($92,500,000),† or 225 per cent greater than in 1913. This increase was due partly to the increased expenditures for wages but chiefly to the increased cost of coal. This

*Published by H. Dunod, Edit. Paris

†Throughout this article francs are converted into dollars at five francs to the dollar, the normal rate of exchange.

item alone increased ten times because of the high price of foreign coal, which is used in much greater quantities than French coal. During this same period the receipts, in spite of the 25 per cent increase in rates made at the beginning of 1918 and extended in 1920 to 70 and 80 per cent for passenger and to 140 per cent for freight, increased only 89 per cent, or 302,000,000 fr. ($60,400,000). The operating ratio increased from an average of 57 per cent in 1913 to 103 per cent in 1919. At the same time the burdens of company capital and loans increased. Taken together it is not to be wondered that the financial situation is deplorable.

The three principal privately operated lines—the Paris, Lyons & Mediterranean, the Est and the Nord—had surpluses in 1913 amounting to 8,000,000 fr. ($1,600,000), 7,308,000 fr. ($1,460,000) and 7,000,000 fr. ($1,400,000) respectively, but since 1914 each of these roads has had a deficit and the deficits of the other railroads have increased. The total deficit for all of the railroads was 2,500,000,000 fr. ($500,000,000) at the end of the last financial year and it is anticipated that the deficit for the present year will almost approach that sum, making a total deficit of 4,500,000,000 fr. ($900,000,000). For the year 1920 it is anticipated that the operating ratio will be about 125 per cent.

In order to pay the shareholders of the railways the minimum guaranteed dividends, the Est, the Paris-Orleans, and the Midi have had recourse to advances from the state. The Nord and the Paris, Lyons & Mediterranean, which lost since 1915 the benefit of the state guarantee, have been authorized to borrow money in order to meet these dividends. This privilege, however, expires with the present financial year.

Effect of the Eight-Hour Day on Finances

To these serious effects of the war has been added the effect of the eight-hour day. This has had a disastrous influence on the financial situation of the railroads as is indicated by the tremendous increase in the deficit for 1920 and has so affected the output of the employees that it is no exaggeration to say that it has been crushing.

The law establishing the eight-hour day was made effective April 23, 1919, and the railroads were forced to put it into application immediately. This reform came at a time when the railroads had hardly recovered from the shortage in men caused by the war and when they were trying to develop their resources to cope with the continually increasing traffic. It was necessary to increase the number of employees out of all proportion to the actual work to be done. Compared with 1914, there was an increase in the number of employees varying from 25 to 32 per cent for station employees, from 30 to 37 per cent for trainmen, and the increase exceeded 40 per cent for engineers and firemen. The total number of employees was increased from 355,900 on January 1, 1914, to 391,400 in 1919, and, at present time there are about 500,000 employees. Naturally a large number of inexperienced men had to be employed. The wages paid to about 355,000 employees in 1913 was 766,800,000 fr. ($153,360,000) as compared to 3,276,000,000 fr. ($655,200,000) paid to about 500,000 employees in 1920, or an increase in wages of 327 per cent for an increase in working force of about 41 per cent.

The output of the workmen has considerably diminished in spite of the increase in the number of men employed. On one of the railroads where the number of locomotive engineers had been increased by 40 per cent because of the eight-hour day, the daily average run has fallen from about 67 miles in 1913, to about 40 miles at the beginning of 1920. Likewise in the shops the hourly output, on account of the application of the eight-hour day and the suppression of piece work, fell to 50 per cent below what it was before in spite of the increase in the number of men employed.

This loss has been partly compensated for by the suppression of certain privileges and by the introduction of new methods of working which are beginning to have their effect. In brief, the eight-hour day has been responsible for a reduction in the number of available freight cars and has considerably retarded the return of the transportation system to its normal state. It has resulted in the increase in the number of losses, delays and damages, and has upset all the plans taken to put the equipment back into good condition.

Condition of Equipment

Since the war the French railways have suffered more from the lack of experienced help than from the lack of the physical plant. The real transportation crisis has been caused by an insufficient number of available locomotives and the delay in repairing them, together with a lack of experienced engineers and firemen. Before the war the number of locomotives out of service for repairs was about 9.8 per cent of the total number. This increased to 20.5 per cent on August 1, 1919, and reached 22.4 per cent on January 1, 1920.

The increase in the number of freight cars out of service for repairs was even greater. Before the war the percentage of bad orders was 3.7 per cent and this item increased to 15.7 per cent on August 1, 1919, and to 18.6 per cent on January 1, 1920. At the present time it requires about double the number of men to keep the same number of locomotives in working order as it did in 1914, and as the number of large engines has materially increased since that time a greater amount of labor per engine is now required. For a given number of workmen the number of repaired units has considerably decreased.

In an endeavor to overcome these conditions the railways are seeking to re-establish the premium or piece work system and are anxious to improve the equipment of the shops by means of labor saving machines. Plans have also been started towards a certain amount of standardization. Four companies, the State, the Midi, the Paris-Orleans, and the Paris, Lyons & Mediterranean, to which was added later the Alsace Lorraine Railroad, formed at the beginning of 1919, an organization called "L'Office Central d'Etudes du Materiel de Chemins de Fer" for this purpose. This organization is divided into four departments, one in charge of tests, one for locomotive design, a third for car design, and the fourth to handle railway electrification.

This committee has already drawn up plans for certain types of standard locomotives. It has made a study of standard designs for freight cars of special types, such as tank cars, steel cars, etc., and has made tests of refrigerator cars for the transportation of fish. After a very thorough investigation of railway electrification this committee has recommended the adoption of 1,500 volts d. c. as a standard.

To improve the car supply the railways offer premiums to the shippers for the prompt release of the cars; they have initiated a sort of priority scheme, and have restricted the passenger service, all of which has notably improved the situation. Freight car repairs have been contracted out to private companies, which has had the effect of bringing the freight car supply almost back to normal. The locomotive situation, however, will not be brought back to its normal basis for another year.

The companies have also established a car service bureau to better control the distribution of cars.

Present and Future Developments

Since the war the railways in the north of France have done a large amount of reconstruction work in the devastated territory. It was necessary to rebuild a large part of the lines on the Nord and Est railways which had been destroyed. At present, in less than 20 months, 1,353 miles out of the

1,467 miles destroyed have been placed in operation and the transportation system in the devastated area is practically back to normal. This in itself is quite remarkable when the difficulties above enumerated are considered.

The problem of railway electrification has also become a question of great importance. A law was passed in 1919 regulating the use of hydraulic power and in this act various sites for the development of hydro-electric plants were conceded to the Paris-Orleans. Since that time a law has been passed for the development of hydro-electric plants on the Rhone river. Plans have been laid for the electrification of nearly 6,000 miles of line, distributed as follows: Paris-Orleans 3,250 miles, the Midi 2,125 miles, and the Paris, Lyons & Mediterranean, 1,525 miles. It is anticipated that this electrification program will entail an expenditure of several billion francs and will effect a saving of 1,500,000 tons of coal a year in addition to improving the traffic density along the lines affected.

During the year there have been developments in the use of fuel oil called "Mazout" for firing locomotives. The Nord, the Paris, Lyons & Mediterranean, the Est, and the Paris-Orleans, have formed, together with the principal shipping companies and several large manufacturers, a company called "Les Consommateurs de Petrole," in order to ensure a sufficient supply of this oil.

Labor Problems

Since the war the railways have endeavored to improve labor conditions by entering into new agreements with the workmen, the provisions of which have a double object:

1. Utilizing the brains and experience of the working staff by giving them every opportunity for putting before their superiors any proposals they may have for improving the service.

2. Safeguarding their interests by guarantees for promotion, increases in salary, strict observance of discipline, with the opportunity for the men to see that the regulations regarding these matters are properly carried out.

For this purpose the workmen elect delegates to three committees. One committee represents the men at local points, the second committee confers with the general manager and a third committee confers with the presidents of the roads. The presidential committee consists of 24 members, 7 from the transportation department, 7 representing the mechanical department, 7 representatives from the engineering department, and 3 representatives from other departments.

The general manager's committee confers with the general manager every three months and the presidential committee confers with the president every six months. These committees will also sit on any inquiry board which is called to give its opinion on questions of discipline. Labor also has representation on committees formed to consider employees' pensions and for the inspection of the co-operative stores. The workmen are thus able to participate in a very practical way in the management of the railways.

Wages have also been standardized so that all employees of the larger railways belonging to the same class of service will be paid alike. Likewise length of service and yearly bonuses have been established.

During the past year there have been two strikes which have put to test the agreements outlined above. The first strike occurred in February but only lasted four days. The second occurred during the month of May and was of a serious character. This lasted 28 days.

The May strike was a revolutionary movement for which elaborate provisions had been made and which was supported by foreign agencies. It was the outcome of a campaign that had been carried on for many years in the Railwaymen's Federation, which at that time included more than half of the railway workmen. This strike was met by a resolute government, a large number of faithful workmen and by the strong arm of public opinion. In combating the strike the railways reduced the services, put into effect the 10-hour day and employed 9,470 volunteers which were drawn from large schools, colleges, former employees and "Unions Civiques" which were spontaneously formed by the citizens of France.

Despite the strong fight put up against the strike it had a serious effect on the railways and the life of the community for which the agitators are entirely responsible. It has been estimated that the loss suffered by the railways on acocunt of the strike amounted to 140,000,000 fr. ($28,000,000), and it required from two to five months to recover from the effects of it. However, this strike, so serious in results, showed what public opinion can do when it is supported by a good organization. The strike failed—at its height it involved 40 per cent of the working forces of four railways and 60 per cent of the engineers and firemen—because it met with the hostility of all classes of society.

There is now a much better feeling among the workmen. They are taking a new interest in their work for they are now paid in proportion to the present cost of living, they are guaranteed by the arrangements outlined above a certain amount of participation in the management of their lines, they are sure of finding new privileges on account of this representation, and they will participate by yearly bonuses in the financial results of the railways. The Railwaymen's Federation which started the strike has retired disorganized and it now includes scarcely one-fifth of the entire railway working force.

The French railroads have almost completely regained their physical and moral equilibrium, the transport crisis has been almost overcome, and peace reigns amongst the working forces. The new statute which the companies have drawn up with the government and which Parliament is now discussing will soon open the way to a new future and will put the railways in a position to take an important part in the work of economic reconstruction. After helping to win the war the French railway companies are getting ready to help the country to win the peace.

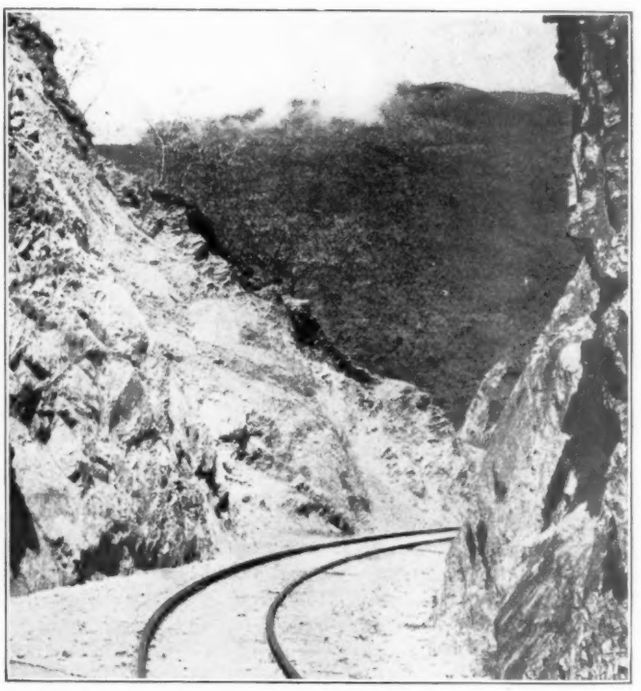


Photo by Keystone View Company, Meadville, Pa.

On the La Guaira & Caracas Railroad of Venezuela

Short Line Association Increases Activities

Experiences Under Federal Control Forced These Roads to Develop a Strong Organization

THE SHORT LINE railroads of the country have been well represented in connection with the principal developments of the year which affected the railroads generally by the American Short Line Railroad Association, which has greatly expanded its activities. Since its last annual meeting 83 railroads have been added to the list of members, so that the total number at the date of a recent report was 440 and new applications are coming in every week.

The short line railroads were given an increased solidarity and the scope of the work of the association was greatly enlarged by the experiences of these roads during federal control. The results of those experiences led the association to take an active part in the work of framing the Transportation Act so as to safeguard their interests upon the return of the railroads to private management and it was found that the short lines, representing local interests, possessed a remarkably strong influence upon members of Congress. The officers of the association have also been remarkably successful in impressing all concerned with the equity and justice of their claims and as a result of their assiduous efforts many provisions of the act were written with a view to their interests.

The trunk line railroads have also been led to accord a greater recognition to the interests of the short lines than ever before. President Bird M. Robinson of the short line association has been made an active member of the standing committee of the Association of Railway Executives and representatives of the short line association are accorded membership on special committees with whose activities they are concerned.

Getting a law passed is sometimes less important than getting it interpreted and applied in the way to accomplish the results intended and the officers of the short line association have found it necessary to keep very busy in this direction throughout the year.

The expansion of the association's organization to handle the increase in its work was authorized at the annual meeting in April and has proceeded as rapidly as circumstances would permit. A law department, a traffic department and a labor department have now been organized and plans for a purchasing department and an equipment trust corporation are under way. The association is also doing a very large amount of ordinary detail work from day to day before the Interstate Commerce Commission, the Railroad Administration and other government departments.

The particular sections of the Transportation Act of interest to the short lines were those authorizing the Interstate Commerce Commission to fix divisions of through rates, because the short lines generally have never been able to effect satisfactory agreements on this subject with their trunk line connections and those providing for a reimbursement of their losses during the period of federal control. Many of the short lines also expected to be able to take advantage of the opportunity to procure loans from the $300,000,000 revolving fund, but as the law has been interpreted the fund has been of little practical use to them because of the requirements as to security. The question of readjustment of divisions is naturally one that will take time to work out to insure justice to all concerned.

The short lines have been particularly disappointed by the interpretation placed on Section 204 of the act, which was supposed to have been drawn in such a way as to provide for the reimbursement of short lines that were relinquished from federal control for losses as compared with their income during the test period, but which the Interstate Commerce Commission has interpreted to apply only to roads which sustained an actual deficit for the period during which they operated their own property after the relinquishment. The short lines have also had the same experience as the trunk lines in having payments certified by the Interstate Commerce Commission under this section and under the guaranty section, 209, held up by the Treasury.

Another of the problems of the short lines arose from the increase in the per diem rate after March 1 from 60 cents to 90 cents, and the discontinuance by some roads of the two day free-time allowance, which seriously affected some of the short lines that did not accept the government guaranty. With the co-operation of the Association of Railway Executives the short line association secured a decision from the Interstate Commerce Commission authorizing the continuance of the former rate and free-time allowance for the guaranty period.

The executive board of the American Short Line Railroad Association recently reported the following as a list of the subjects which have been settled or are receiving the assiduous attention of the organization.

1. Settlement of the per diem question.
2. Establishing of the right of short-line railroads to participate in the rate increase in case Ex Parte 74.
3. Defense of short-line railroads before the United States Labor Board.
4. Participation in cases now pending which involve the application of the rule of divisions.
5. Preparation and prosecution of individual applications for the establishment of through routes in accordance with provisions of the Transportation Act of 1920.
6. The preparation and prosecution of individual applications for increased divisions in accordance with the Transportation Act of 1920.
7. Assistance to individual short-line railroads in the matter of valuation now being conducted by the Bureau of Valuation of the Interstate Commerce Commission.
8. Creation of a plan through which short-line railroads may procure loans from the government with which to purchase equipment.
9. Advice and assistance to individual roads in effecting settlements with the director general.
10. Plan for effecting agreements with trunk line railroads for increased divisions through the creation of regional committees in the three classification territories.

Under the head of work to be done the board listed the following:

1. Amend the Transportation Act of 1920 at the coming session of Congress in the following particulars:

(a) Broaden terms of Section 210 so the short-line railroads may borrow from revolving fund, which, in most cases, is now impossible.

(b) Amend Section 204 so that short-line roads whose earning power was reduced in the guarantee period as compared with the test period may be reimbursed.

(c) Amend Section 209 so all roads may procure funds due them under government guarantee without having to wait for the final check of federal auditors, as now required.

2. Maintain close and watchful contact with the Interstate Commerce Commission in the formation of plans for the consolidation of all railroads; and represent short-line rail-

roads before the commission in the adoption of any such plans and the putting of same into execution.

3. Prepare and present to Congress legislation which will assure speedy and fair settlement of claims of short-line railroads against the director general.

4. Oppose legislation which proposes to make changes in the Transportation Act of 1920 which are inimical to the interests of short-line railroads.

5. Protect and further the interests of short-line railroads by pressing for a readjustment of all divisions of freight rates so that each road shall receive a fair return; that is to say, its fair proportion of the revenue produced by the general rate structure.

6. Protect the interests of short-line railroads in the final valuation the commission is required to make as the basis for a fair return to each railroad.

7. Defend the interests of short-line railroads in the further adjustment of railway mail pay.

8. Defend the interests of short-line railroads in the matter of taxation both as to the interpretation of laws now in effect and proposed changes in such laws.

The labor department of the association is under the direction of James Berlingett, assistant to the president, at Chicago, but Mr. Berlingett has recently been given a leave of absence on account of ill health and F. C. Reilly, traffic manager for the western district, is temporarily in charge. This office has given particular attention to the representation of the short lines before the Railroad Labor Board.

The traffic department is under the direction of L. S. Cass, vice-president, and includes three traffic managers, Mr. Reilly for the western district and R. A. Belding for the Official Classification Territory and J. A. Streyer for Southern Classification Territory, with office at Washington; also a tariff bureau at Washington under the direction of I. T. Hanson, assistant to the vice-president. The traffic department will render assistance in negotiations for increased divisions. The legal department is represented by Ben B. Cain, general counsel, and S. S. Ashbaugh, special counsel, at Washington.

The association has organized the Consolidated Railway Equipment Corporation under the laws of Delaware to finance the purchase of new equipment, with the assistance of a government loan, under a plan which is to be announced shortly.

Norfolk & Western Labor Dispute

HEARINGS in the controversy between the Norfolk & Western and its conductors and trainmen were opened before the Railroad Labor Board at Chicago on January 3. The case was assigned to Bureau No. 3 of the Board, consisting of W. L. Park, chairman, H. T. Hunt, A. O. Wharton, Horace Baker and J. J. Forrester.

It will be recalled that differences between the Norfolk & Western and its trainmen and conductors first arose early in 1919, when they failed to agree on requests for certain changes in the organization's contracts with the road. Because of the unsettled conditions prevailing at that time, the demands were not considered immediately. However, later in the year negotiations were started between the employees and the carrier, ending in November when it was seen that agreement was impossible. It was decided then to submit the matter to the Board, but meanwhile both the trainmen and conductors had taken strike votes. This led the Board to request the executive officers of the conductors' and trainmen's organizations to appear before the Board to show whether or not they had violated the law in ordering this vote. An executive session of the Board was held on December 16 at which this testimony was taken; however, no formal action was subsequently taken by the Board other than to issue a warning to carriers and brotherhoods, and the case properly came before it on January 3.

When the requests and contentions of the two organizations were assembled it was found that in several instances these requests could be conveniently considered together; accordingly the first point of difference taken up by the Board was that of changing the home terminal from Columbus, Ohio, to Portsmouth. This move was opposed by the employees, represented by Val Fitzpatrick, vice-president of the Brotherhood of Railroad Trainmen, and W. C. Turner, vice-president of the Order of Railway Conductors, on the ground that it would result in loss to the employees who had purchased homes in Columbus and little material benefit to the company. The carriers represented by W. J. Jenks, general manager, and Charles P. Neill, both of whom contended that the change was merely a "paper change" made to reduce the payment of terminal overtime.

The next point of difference considered by the Board was the request of the organizations for a local freight rate for mine run service. The employee's representatives contended that this service should be paid local freight rates for the reason that the men engaged in it cannot make mileage and are required to do switching service between terminals and are not accorded the same treatment in this respect as are the employees of other railroads in the same territory. The representatives of the carrier contended that the employees' request was simply a request for a rate higher than that established by the Board's Decision No. 2.

The next point taken up by the Board was that of the rates of pay for branch line service on the Norfolk & Western. The controversy between the carrier and its employees was based entirely on the manner in which certain wage rulings of the Railroad Administration had been applied and the testimony presented to the Board dealt entirely with the technical aspects of this application.

The preceding three points of difference were common to both of the organizations involved and were therefore considered together. The remaining points of difference taken up at the first day's session were between the Brotherhood of Railroad Trainmen and the carrier and included the employees' request that the rate for "baggagemen handling express" be incorporated in the trainmen's schedule, a disagreement over the revision of the "called and not used" rule to conform to Supplement 25 to General Order No. 27, and the employess, request for a new discipline rule. The carriers' contention in the first case was that inasmuch as there are no employees handling baggage on their line, the incorporation of the rule in their schedule with the trainmen is needless. In the discussion of the second case, it became evident that the differences between the railroad and its employees revolved about a minor technicality and this led Chairman Park to state that "it seems to illustrate to me, as one member of the Board, the advisability of carriers and employees getting together before they have these formal hearings and perhaps throw out of the window a lot of this, or agree to many things, and certainly agree to a joint statement of facts and to get down to things that you just absolutely cannot agree to." In the discussion following it developed that the representatives of the carrier and its employees agreed on the principles of the controversy, leaving only minor technical points to be adjusted. Practically the same conditions prevailed in discussing the establishment of a new discipline rule, it being found that the differences between the men and the carrier were of a minor character and could easily be adjusted by conference.

A real point of difference between the carrier and its yard employees, however, was indicated early in the Board's opening session when L. C. Going, attorney for the Association of Colored Railway Trainmen, requested permission of the Board to be heard.

Statistical Section

Railway Revenues and Expenses for the Year 1920

Receiverships and Foreclosure Sales During 1920

Locomotive Orders Show Increase in 1920

Increase in Passenger Car Orders Continues

Purchases of Freight Cars Increase in 1920

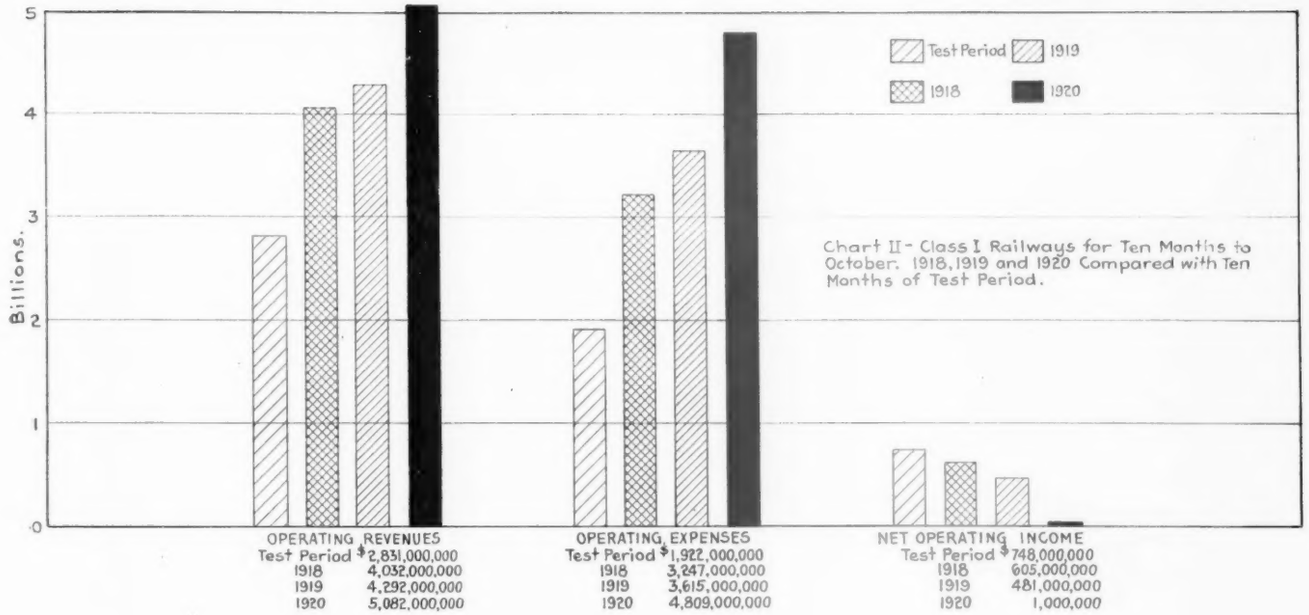
Railway Lines Abandoned During the Year 1920

New Construction Conspicuous by Its Absence

Signal and Interlocking Work Reaches Low Mark

Railway Supply Exports Showed Marked Decline

EDGAR E. CLARK
Chairman of the Interstate Commerce Commission



Railway Revenues and Expenses in the Year 1920

Smallest Net Operating Income in Any Year Since the I. C. C. Made Its First Report in 1888

By Julius H. Parmelee

FOR THE THIRD TIME in succession the man who attempts an annual review of railway statistics finds his task difficult. The year 1918 saw federal control inaugurated, with many fundamental though temporary changes in accounting and statistics; saw in May the first general increase in railway wages ever granted; saw in June a marked increase in freight and passenger rates; was face to face throughout with a kaleidoscopic series of changes in rates, wages, prices, and operating conditions that made a statistical review of the year most difficult. Toward the close of the year there was a decided slump in traffic, which continued well into 1919.

The year 1919 not only inherited this disturbing condition from 1918, but added a number of changes on its own account. Wages and prices pursued an almost steadily rising trend, while two things had a marked effect on operations toward the close of the year, namely, the coal strike of November-December, and the near approach of the termination of federal control. The exact date of the return of the railways to their owners was not known until the last of December, yet for months before the end of the year it was regarded as certain that the date of return would not be much later than the first of January, as announced in the President's message to Congress.

THE STATISTICAL record of the railways of this country for the past year is one of superlatives. It includes among other things:

The greatest traffic in the history of railways.

The greatest operating revenues.

The greatest operating expenses.

The greatest wage aggregate.

The greatest taxes.

The smallest net operating income recorded in more than 30 years.

The year 1920 opened, therefore, with but one certainty in the railway situation, which was the definite knowledge inherited from 1919 that on March first federal control would terminate. Virtually every other factor in the situation spelled uncertainty a year ago—what the future of the railways would be, what legislation would be enacted, how the wage and labor situation would evolve, what traffic would be offered and at what rates the railways would handle it. Finally, there was the vital question whether railway managements would find it possible to set their houses speedily in order and prove to the American public that its verdict against a continuation of government control of transportation was wise. The year 1920, as the railways looked out upon it twelve months ago, was fraught with potent possibilities and dangers.

Today, one year later, the period has clearly stamped itself as the most important single year of any in American railway history, not only because the railways have returned to their owners under a new public policy of regulation, but also because that policy, with its endless ramifications, will profoundly affect future railway history to the end of time. The Transportation Act became effective with the return of the railways on March first; then came the six-month period

of readjustment of wages and rates, during which the government wisely continued its financial support; finally, the railway companies on September first launched out under their own power, to meet whatever calm or storm might be ahead. Add to this the operating crisis through which the railways passed as a result of the April strikes, and their successful campaign through the summer and fall to put the crisis behind them, and the story of the year is complete in a few sentences.

This is not the place to recount the railway history of the year 1920, interesting though it is at every point. The reason for reviewing the past three years in a few brief paragraphs is merely to set up the background against which the statistical record of the year may be seen in bolder relief.

Summarized, the statistical record of 1920 is one of superlatives. It includes:

The greatest traffic in railway history,
The greatest operating revenues,
The greatest operating expenses,
The greatest wage aggregate,
The greatest taxes, and
The smallest net operating income in more than 30 years.

Traffic

Railways of the United States in the calendar year 1916 broke all records of freight traffic. The total traffic of railways of Class I in that year was 396 billion net ton-miles (including revenue and non-revenue freight). This record was shattered in 1917, with 430 billion, and again in 1918, with 440 billion. There was a recession in 1919 to 395 billion ton-miles, but the year 1920 again broke the record, with approximately 448 billion, which was 8 billions above the greatest previous record, and 13 billions greater than the average of the two war years 1917 and 1918. The fact that in four of the past five years the American railways have surpassed all their previous efforts in the handling of freight evidences their service to the American people during recent war-time and post-war periods.

The monthly freight statistics for 1920 present an interesting story. Stated in billions of ton-miles, it is as follows, November and December being partially estimated:

Months of 1920	Net ton-miles (billions)	Months of 1920	Net ton-miles (billions)
January	34.8	August	42.7
February	32.8	September	41.0
March	38.0	October	42.6
April	28.5	November	36.5
May	37.9	December	35.0
June	38.2		
July	40.4		448.4

This short table speaks eloquently of the successful effort made by the railways during the summer and fall months of 1920 to clear up traffic congestion and meet the unprecedented demands upon their facilities. Prior to 1920, the largest freight traffic recorded for any one month was 40.8 billions of ton-miles, which was in the war-time month of August, 1918. This record was surpassed, it will be noted, in the three months of August, September and October, 1920, with July only a short distance behind. Even the months of November and December, which in normal years show seasonal declines, and in 1920 might well have been affected by the decline in general business conditions, held up their average remarkably well.

As to passenger traffic, railway travel has been growing at a rapid pace, the years from 1915 to 1920 showing steadily maintained increases. In 1917, 1918 and 1919, the normal passenger traffic was augmented by heavy movements of troops. The year 1919 showed the heaviest passenger traffic on record, railways of Class I handling 46.4 billion passengers one mile in that year. This was 4 billion passenger miles greater than in 1918, 7 billions greater than in 1917, and 8 billions greater than in 1916. In spite of the record-breaking figures for 1919, the results for 1920 seem at the present writing to have equalled the 1919 record. Returns for passenger miles are not reported or compiled so promptly as net ton-miles, but for the first nine months there was an increase of 1.4 per cent over 1919, and while the passenger traffic fell off somewhat after the increase in rates on August 26, indications are that the total for the year was as high as the total for 1919. Whatever the final results may show, it is certain that the freight and passenger traffic combined was greater in 1920 than in any previous year.

The traffic results for 1920 have been emphasized, not only because they represent a record-breaking performance, but more particularly because they prove that the efficiency developed by the railways in 1920, in the way of increased car mileage per day, increased loading per car, and the like, was attained while carrying the heaviest traffic ever handled, and with no greater plant or facilities than before the United States entered the war.

Revenues

Total operating revenues of Class I railways in 1920 approximated $6,230,000,000, the greatest revenue aggregate on record. This was $1,046,000,000 greater than the revenues of 1919, which represented the largest aggregate up to that time. The increase for 1920 was the result, of course, of the increased rates in effect part of the year and the increased traffic. At the time the new rates went into effect, on August 26, it was estimated that they would produce $1,500,000,000 a year in revenues, but actual results for the months of September to November do not indicate that as yet such an amount is being realized. Whether it will be fully realized in 1921 will depend upon a number of factors undeterminable at the present time, such as the effect of recent orders of the Commission raising intrastate rates to the interstate level, the trend of traffic and adjustments that probably will be made in local and other specific rates.

In 1918 the revenues of all the railways for the first time surpassed five billions of dollars; in 1920 they were greater than six billions.

Of the $6,230,000,000 of revenues for 1920, $4,291,000,000 represented freight revenue, $1,317,000,000 was passenger revenue, and the balance of $622,000,000 was revenue from mail, express and miscellaneous operations. As compared with 1919, there was an increase of $734,000,000, or 20.6 per cent, in freight revenue; an increase of $139,000,000, or 11.8 per cent, in passenger revenue, and an increase in other revenue of $173,000,000, or 38.5 per cent. Total revenues increased 20.2 per cent.

The picture of operating revenues by months portrays the cumulative effect of the increased rates and traffic after July.

1920, Month	Total Operating revenues Class I railways (millions)	1920, Month	Total Operating revenues Class I railways (millions)
January	$501	August	$555
February	425	September	616
March	461	October	642
April	402	November	575
May	456	December	575
June	494		
July	528	Total	$6,230

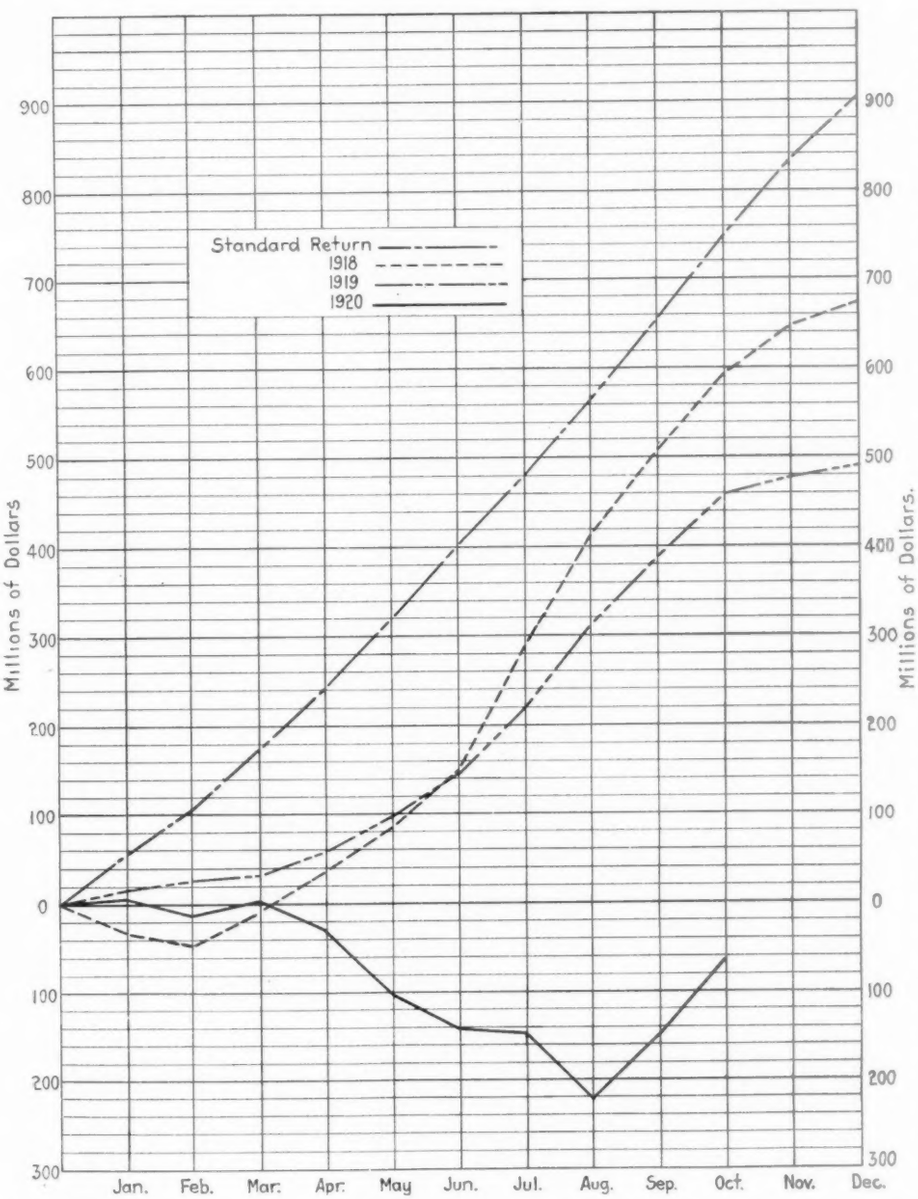
In the table November and December figures are partially estimated. The total for January was out of proportion with the months next succeeding, because it included some $50,000,000 of back mail pay.

Expenses

Total operating expenses in 1920 approximated $5,750,000,000 for Class I railways. Like the revenues, this was a record amount, being greater than in 1919 by $1,330,000,000. Part of the increased expense of operation grew out of the increase in wages granted by the Railroad Labor Board as of May 1, which (for the eight months from May 1 to December 31) added some $400,000,000 to the railway

payroll; part was due to the increased cost of fuel, which the Interstate Commerce Commission has reported, during the first nine months of the year, at seventy-four cents a ton more than during the same period of 1919, which would account for about $80,000,000 of additional annual expense; part was due to the higher cost of other materials and supplies, and to the greater amounts of material and fuel utilized.

1920 Month	Total Operating expenses Class I railways (millions)	1920 Month	Total Operating expenses Class I railways (millions)
January	$415	August	$679
February	415	September	511
March	422	October	527
April	404	November	473
May	441	December	473
June	478		
July	512	Total	$5,750



It is important to refer to the text in studying this diagram and to note that the reported revenues and expenses for several months have been adjusted to include or exclude certain items that did or did not belong to these months.

Chart 1—Net Operating Income Calculated by Months. 1918, 1919 and 1920 Compared with Standard Return. Class I Railways

Maintenance of way expenses amounted to $1,034,000,000, maintenance of equipment expenses $1,573,000,000, and transportation expenses $2,851,000,000. The increase in maintenance of way was $256,000,000, or 32.9 per cent; maintenance of equipment increased $340,000,000, or 27.6 per cent; transportation expense increased $658,000,000, or 30.0 per cent. The total operating expenses increased 30.1 per cent.

The operating expenses by months were as follows, November and December being estimated:

The aggregates for May and June are smaller, while those for July and August are greater, than would have been the case had not the wage increase been made retroactive to May 1. Certain amounts of back pay chargeable to May and June were actually charged to July and August, thus throwing the totals for all four months out of line with other months of the same year and with corresponding months of preceding years.

Wages

Statistics showing the total railway payroll in 1920 are not at hand as this is written, but it seems likely that the wages of the employees of Class I railways aggregated some $3,260,000,000. This estimate is computed by adding to the 1919 payroll of $2,830,000,000, two-thirds of the annual increase in wages granted by the Railroad Labor Board, the increase having been in effect during eight of the twelve months. The payroll for 1920 may have been greater than the figure indicated, because there were some minor increases in January and February for which no allowance is made, and because the eight months of the increased wage scale included the months of the year when maintenance work was heaviest. But assuming $3,260,000,000 as approximately correct, wages in 1920 represented 56.7 per cent of total operating expenses. That is, 56.7 cents out of every dollar of expenditure went to labor. Compared with total revenues, labor in 1920 received 52.4 cents out of every dollar of revenue, compared with 45.1 cents in 1914.

The general increase in railway wages which the Labor Board put into effect on May 1, 1920, was the greatest single increase ever granted by any tribunal to any group of workers in the history of the United States, or, for that matter, in the history of the world. The amount of the increase, reduced to an annual basis, was $617,000,000, and with collateral increases to certain small groups of employees to whom the award did not apply, made imperative as a result of raising the general level of railway wages, will prove to be no less than $625,000,000, or about 22 per cent on the scale of wages in effect before the award was made. It is a commentary on the quick way in which the American people have accustomed themselves to think in billions that the announcement of this increase aroused hardly a ripple of pub-

lic comment. By reason of this increase, railway wages are now at the highest point ever reached, the average annual earnings per employee being greater than $1,800.

Taxes

Railway taxes in 1920, as reported by roads of Class I, amounted to about $275,000,000. This does not include $6,000,000 of war taxes not reported in the federal accounts of January and February. The taxes of $199,000,000 reported for 1919 did not include about $36,000,000 of war taxes. Placing the two years on a comparative basis by adding the excluded war taxes, the total for 1920 becomes $281,000,000, compared with $235,000,000 in 1919, an increase of $46,000,000, or nearly 20 per cent. These taxes for 1920 represent the largest amount paid in any one year.

Net Operating Income

We come now to the most astonishing feature of the railway income account in 1920, which is that the net operating income was the smallest for any year since the Interstate Commerce Commission made its first summary of railway revenues and expenses in 1888. For the first ten months of 1920, to November first, railways of Class I earned practically nothing over expenses, taxes, equipment and joint-facility rentals, and this in the face of the fact that the revenues in January included some $50,000,000 of back mail pay that was earned in prior years, and that $6,000,000 of war taxes for January and February were not deducted. This result is so astonishing that it may be well to compare the same ten-month period over the past four years:

Year	Net operating income (ten months ended October 31)	Year	Net operating income (ten months ended October 31)
1920	$1,078,000	1918	$605,179,000
1919	481,083,000	1917	833,543,000

The steady decline from $833,000,000 in the first ten months of 1917 to slightly over $1,000,000 in 1920 in great measure explains the necessity for the increased rates made effective last August.

For the year 1920 as a whole, I estimate the net operating income of railways of Class I at approximately $150,000,000, virtually all of which was earned in November and December. Add to this the $100,000,000 of deficit to be made up by the Railroad Administration for the operations of January and February, and the $650,000,000 of deficit incurred during the six-month guaranty period and payable from the U. S. Treasury, and the total net receipts of the railways for the year become approximately $900,000,000, or about the amount of their standard return. This is a return of five per cent on the valuation that may be assigned to the property of railways of Class I, on the basis of the tentative valuation made by the Commission in its rate decision, and falls $180,000,000 short of a return of six per cent for the year.

The cumulative monthly trend of net operating income is set out in Chart I, which covers the test period, the years 1918 and 1919, and the first ten months of 1920. In this chart the reported revenues and expenses of the several months have been adjusted to include or exclude items that did or did not belong to those months. For example, the back pay charged to certain months of 1918 and 1920 has been transferred to the months to which really chargeable; the back mail pay credited to January, 1920, has been distributed over the months of 1918 and 1919; the war taxes and corporate expenses of the federal control period have been brought into the accounts, wherever they were not already charged. While the results cannot in the nature of things be exact to the last dollar, the chart does compare the monthly results of 1918 to 1920 with what may be considered the normal experience of the test period, thereby eliminating the distorted relationships that exist in some of the accounts as actually reported. The chart does not correspond to the figures already given for 1920 and earlier periods, but is presented with the thought of furnishing a picture of the trend of net income since the government took charge, on a basis fairly comparable with normal conditions.

Estimated Income Account—1920

Summarizing the revenues, expenses and taxes of Class I railways, as set out in preceding paragraphs, their estimated income account for 1920 was as follows:

	Railways of Class I, 1920
Total operating revenues	$6,230,000,000
Total operating expenses	5,750,000,000
Net operating revenue	$480,000,000
Taxes	275,000,000
Uncollectible revenue	1,000,000
Equipment and joint facility, rentals—Dr.	54,000,000
Net operating income	$150,000,000

As compared with the year 1919, the net operating income was less by $366,000,000, or 70.9 per cent.

The distribution of the railway operating dollar in 1920 and 1919 was approximately as shown below:

	1920	1919
Total revenues (the dollar)	100.0	100.0
Labor	52.4	54.4
Fuel for locomotives	9.0	9.0
Loss and damage	4.0	3.5
Other expenses, materials, etc.	26.9	18.6
Taxes	4.4	4.5
Equipment, etc., rentals	0.9	1.1
Net operating income	2.4	8.9
Add government guarantee	12.0	7.4
Total net receipts	14.4	16.3

Following the income account in the same way through fixed charges, rentals for leased road, other additions and deductions, we find that 5.9 cents out of every dollar of railway revenue in 1920 remained for dividends, betterments and surplus. This compares with 6.9 cents in 1919, 9.3 cents in 1918, 14.8 cents in 1917, and 18.0 cents in 1916.

The chart at the head of this article emphasizes this narrowing margin in a different way. It shows the total revenues, total expenses, and net operating income of the first ten months of 1920, compared with the same months of 1919, 1918, and the test period. The outstanding feature of the chart, of course, is the steadily rising revenues on the left and the steadily lessening net income on the right, falling so low in 1920 as to be scarcely discernible.

Looking Forward

Turning to the future, where the chief interest lies, the picture is less depressing. The railways have set their minds on no further increases in rates, if it is humanly possible to avoid them, and are making every effort to so reduce expenses and increase operating efficiency as to raise net operating income to a six per cent basis in 1921. While it is impossible to predict the trend of earnings this coming year, yet a glance at the results the year 1920 would have shown, had the increased rates and wages been in effect the whole year, may give a line on the possibilities of the future.

Had the year 1920 been on the same wage and rate level throughout, the results would have been something like these:

	Adjusted results for 1920
Total operating revenues	$7,300,000,000
Total operating expenses	5,950,000,000
Taxes, etc.	360,000,000
Net operating income	990,000,000
Rate of return on valuation	5.5

In summary, we are closing the book on a remarkable year, both because the whole railway industry moved forward into a new era, and because records were shattered in almost every respect. The period of experimentation with the new conditions is by no means over, and there are still many uncertainties in the year that lies ahead, chief among which is the uncertainty as to earnings adequate to sustain and improve railway credit. In spite of this uncertainty, railway managements are facing the future with hope, a spirit of co-operation, and full recognition of their duty to serve the public.

Receiverships and Foreclosure Sales During 1920

Denver & Rio Grande Situation Most Interesting Feature at Present Time

THE DEVELOPMENTS of the year 1920, insofar as railway receiverships and foreclosures are concerned, have not been great. The number of roads in the hands of receivers and the mileage concerned at the close of this year will be found to approximate closely the totals given in the *Railway Age's* annual review number of last year. The list of roads in the hands of receivers shows but few changes in roads as between the two years and no important ones.

There has been one road, however, which has attracted no small amount of interest among students of railway finance during 1920. Reference is made to the Denver & Rio Grande. This road has been in the hands of receivers since January, 1918. It was sold at foreclosure on November 20, 1920, but court confirmation of the sale has been withheld pending a decision from the Court of Appeals on the right of the stockholders to intervene in the foreclosure proceedings. A new company has been formed to take over the operation of the road; it was incorporated in November under the name of the Denver & Rio Grande Western. The Denver & Rio Grande receivership and reorganization are of special interest from two points of view. One is in the fact that the new owners of the road are the owners of the Western Pacific, a road built by the Denver & Rio Grande as an extension to the Pacific coast, wherein we have a case of a subsidiary property acquiring possession of its parent road. The other point of interest is the proposal on the part of the owners of the Western Pacific in reorganizing the Denver & Rio Grande to eliminate the common stockholders of the property.

Construction of the Western Pacific was started in 1904

RAILROADS IN THE HANDS OF RECEIVERS

Name of road	Mileage	Date of receivership	Bonds of old company	Stock of old company	Total old company securities
Altoona Northern	16	Aug. 8, 1919	$370,000	$675,000	$1,045,000
Birmingham & Southeastern	48	July 26, 1920	747,600	700,000	1,447,600
Birmingham, Columbus & St. Andrews	38	Dec. 25, 1908	250,000	4,000,000‡	4,250,000
Cape Girardeau Northern	104	April 14, 1914	1,500,000	110,000	1,610,000
Caro Northern	17	.....	.....	100,000	100,000
Chicago & Eastern Illinois	1,131	May 27, 1913	59,289,000	18,267,900	77,556,900
Chicago, Peoria & St. Louis	247	July 31, 1914	4,236,000	4,000,000	8,236,000
Colorado Midland†	338	July —, 1918	9,532,000	10,000,000	19,532,000
Colorado Springs & Cripple Creek District	74	June 11, 1919	2,634,000	2,000,000	4,634,000
Creston, Winterset & Des Moines	21	June 25, 1914	200,000	98,600	298,600
Dansville & Mt. Morris	15	June 7, 1894	150,000	50,000	200,000
Denver & Rio Grande	2,585	Jan. 26, 1918	120,757,000	87,775,670	208,532,670
Denver & Salt Lake	255	Aug. 16, 1917	12,171,516	583,515	12,755,031
Eastern Kentucky	36	March 31, 1919	.....	3,455,900	3,455,900
Eagles Mere	10	Dec. 22, 1920	72,000	49,000	121,000
Ft. Smith & Western	254	Oct. 9, 1915	6,240,000	5,000,000	11,240,000
Georgia & Florida	403	March 27, 1915	8,852,000	8,750,000	17,602,000
Gulf, Florida & Alabama*	157	May 9, 1917	4,446,000	4,410,000	8,856,000
Hawkinsville & Florida Southern	95	July 17, 1920	586,000	100,000	686,000
Helena, Parkin & Northern	15	July 3, 1919	65,000	100,000	165,000
Houston & Brazos Valley	30	Oct. 27, 1915	420,000	24,000	444,000
International & Great Northern	1,160	Aug. 10, 1914	27,073,000	4,822,000	31,895,000
Kansas City, Mexico & Orient	272	April 16, 1917	31,000,000	20,000,000	51,000,000
Kansas City Northwestern†	171	Feb. 23, 1917	.....	1,400,000	1,400,000
Louisiana & North West	121	Aug. 23, 1913	2,250,000	2,300,000	4,550,000
Macon & Birmingham	97	Feb. 1, 1908	500,000	500,000	1,000,000
Manistee & North Eastern	262	Dec. 24, 1918	1,172,000	2,000,000	3,172,000
Marshall & East Texas‡	92	Jan. 25, 1917	1,180,000	200,000	1,380,000
Memphis, Dallas & Gulf	130	Sept. 10, 1920	2,052,000	2,052,000	4,104,000
Missouri & North Arkansas	365	March —, 1912	10,309,000	8,340,000	18,649,000
Missouri, Kansas & Texas Lines	1,739	Sept. 27, 1915	142,993,500	76,283,257	219,276,757
Morgantown & Wheeling	27	July —, 1916	500,000	345,800	845,800
Northwestern Terminal	3	Jan. 21, 1920	2,217,000	3,000,000	5,217,000
Ocilla Southern	69	June 30, 1918	416,000	265,600	681,000
Ocklawaha Valley	54	Jan. 21, 1918	.....	250,000	250,000
Orangeburg Railway	17	June 19, 1916	100,000	100,000	200,000
Paris & Mt. Pleasant	51	Feb. 26, 1920	600,000	75,000	675,000
Pine Bluff & Northern	8	Feb. 9, 1916	43,000	160,000	203,000
Pittsburgh & Susquehanna	15	Jan. 15, 1919	400,000	500,000	900,000
Pittsburg, Shawmut & Northern	210	Aug. 1, 1905	14,655,600	15,000,000	29,655,600
Rock Island Southern	56	March 18, 1920	2,764,750	2,944,800	5,709,550
Rome & Northern	23	Feb. 28, 1911	.....	1,000,000	1,000,000
Roswell Railroad	10	April —, 1920	135,000	75,000	210,000
St. Louis, El Reno & Western	42	Oct. 9, 1915	817,000	970,800	1,787,800
Salina Northern	81	July 27, 1917	1,500,000	1,143,000	2,643,000
San Antonio, Uvalde & Gulf	317	Aug. 14, 1914	4,413,000	280,000	4,693,000
Sharpsville Railroad	18	Jan. 21, 1897	.....	350,000	350,000
Southwestern Railway†	30	Nov. 11, 1917	354,000	35,000	389,000
Tennessee, Alabama & Georgia	96	Dec. —, 1920	.....	3,100,000	3,100,000
Tennessee Central	293	Jan. 1, 1913	12,220,900	7,941,450	20,162,350
Texas & Pacific	1,947	Oct. 27, 1916	60,061,017	38,755,110	98,816,127
Tidewater & Western†	93	May 14, 1917	300,000	300,000	600,000
Timpson & Henderson	34	Nov. —, 1919	.....	250,000	250,000
Toledo, Peoria & Western	248	July 2, 1917	4,895,000	4,076,900	8,971,900
Toledo, St. Louis & Western	454	Oct. 22, 1914	17,293,257	19,947,600	37,240,857
Trinity & Brazos Valley	369	June 16, 1914	8,760,000	304,000	9,064,000
Valdosta, Moultrie & Western	42	Nov. 5, 1920	.....	350,000	350,000
Wabash, Chester & Western	65	July 15, 1914	690,000	1,250,000	1,940,000
Waupaca—Green Bay	10	Sept. 1, 1917	69,000	61,400	130,400
West Virginia Midland	46	May 21, 1920	600,000	1,000,000	1,600,000
Wichita Falls & Northwestern	329	May 31, 1917	6,537,000	2,000,000	8,537,000
Williamsport & North Branch	46	Jan. 8, 1917	545,000	1,324,662	1,869,662
	15,401		$591,934,140	$375,302,364	$967,236,504

*Sold at foreclosure October 14, 1919, and reorganized in November, 1919, under name of Gulf, Pensacola & Northern. Sale not yet confirmed by court so property has not been turned over to new company. †Operations suspended. ‡Authorized.

and operation was begun in July, 1911. The Denver & Rio Grande guaranteed the interest on $50,000,000 first mortgage 5 per cent bonds of the Western Pacific and it assisted in its construction also by taking $25,000,000 second mortgage bonds and $26,800,000 in promissory notes and other claims. It owned $62,500,000 of the stock of the Western Pacific.

RECEIVERSHIPS ESTABLISHED IN 1920

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Birmingham & Southeastern	48	$747,600	$700,000
Eagles Mere	10	72,000	49,000
Hawkinsville & Florida Southern	95	586,000	100,000
Memphis, Dallas & Gulf	130	2,052,000	2,052,000
Northwestern Terminal	3	2,217,000	3,000,000
Paris & Mt. Pleasant	51	600,000	75,000
Rock Island Southern	56	2,764,750	2,944,800
Roswell Railroad	10	135,000	75,000
Tennessee, Alabama & Georgia	96	.....	3,100,000
Valdosta, Moultrie & Western	42	.....	350,000
Totals	541	$9,174,350	$12,445,800

The Western Pacific failed to earn the interest on its first mortgage bonds. The Denver & Rio Grande was unable to make good its guarantee, with the result that in March, 1915, the Western Pacific went into the hands of receivers. It was reorganized in December of that year and one of the terms of the reorganization was that the holders of the defaulted bonds should transfer to the new company their claims against the Denver & Rio Grande. The Equitable Trust Company of New York, trustee for the bonds, with the co-operation of the new company (owning about 95 per

SUMMARY OF RECEIVERSHIPS FOR 45 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	42	6,662	$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
1879	12	1,102	39,367,000
1880	13	885	140,265,000
1881	5	110	3,742,000
1882	12	912	39,074,000
1883	11	1,990	108,470,000
1884	37	11,038	714,755,000
1885	44	8,836	385,460,000
1886	13	1,799	70,346,000
1887	9	1,046	90,318,000
1888	22	3,270	186,814,000
1889	22	3,803	99,664,000
1890	26	2,963	105,007,000
1891	26	2,159	84,479,000
1892	36	10,508	357,692,000
1893	74	29,340	1,781,046,000
1894	38	7,025	395,791,000
1895	31	4,089	369,075,000
1896	34	5,441	275,597,000
1897	18	1,537	92,909,000
1898	18	2,069	138,701,000
1899	10	1,019	52,285,000
1900	16	1,165	78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2,606	210,606,882
1912	13	3,784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689
1917	19	2,486	61,169,962
1918	8	3,519	242,090,800
1919	7	244	11,886,779
1920	10	541	21,620,150

cent of the defaulted bonds), then pressed suit against the Denver & Rio Grande and in May, 1917, a decision was handed down by the district court in favor of the Equitable Trust Company and awarding it the sum of $32,272,274. This verdict was later affirmed by the Court of Appeals, and with accrued interest the total was brought up to approximately $38,000,000. The final result was the receivership of the Denver & Rio Grande on January 26, 1918.

The Western Pacific's interest in the Denver & Rio Grande is contained not only in its judgment against that property on the defaulted bonds but also in the fact that the Denver & Rio Grande is its eastern connection. This naturally is a most important factor, because the Western Pacific has not the branch lines and facilities generally to enable it to make the most of its main line from San Francisco to Salt Lake City without this connection to the east from the latter point over the Denver & Rio Grande. It is competing with carriers stronger than itself, such as the Southern Pacific, Union Pacific and Atchison, Topeka & Santa Fe, which have developed their territory by means of feeders and all of which have through lines of their own to the east. The

FORECLOSURE SALES IN 1920

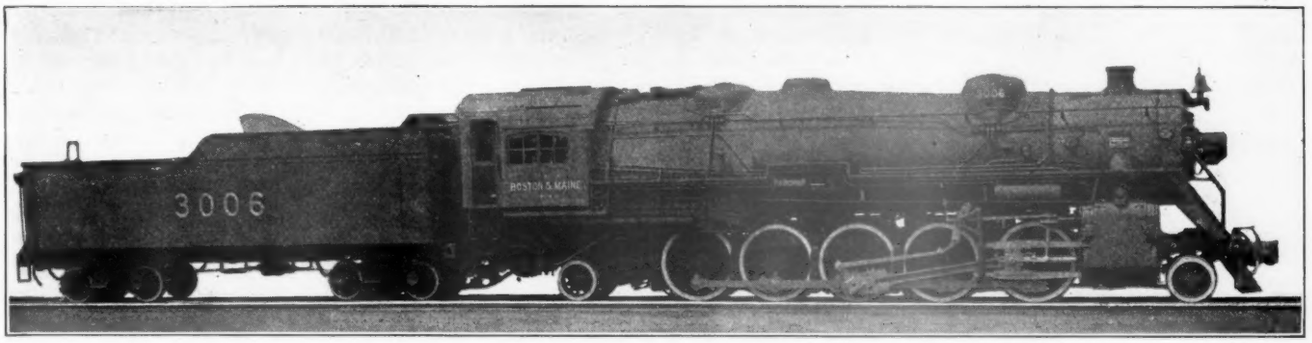
Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Arkansas & Louisiana Midland	103	$200,000	$1,000,000
Evansville & Indianapolis	138	2,500,000	2,000,000
Gould Southwestern	18	.....	51,000
Hawkinsville & Western	23	.....	.....
Newport & Sherman's Valley	28	200,000	165,100
Pacific & Eastern	33	300,000	500,000
Tennessee & North Carolina	37	454,000	306,100
Totals	380	$3,654,000	$4,022,200

whole question has been further complicated by the fact that the new owners of the Denver & Rio Grande (that is provided the sale on November 20 is confirmed) expect to have to spend some $12,000,000 at once to put that property in proper shape to handle its present traffic.

SUMMARY OF FORECLOSURE SALES IN 45 YEARS.

Year	No. of roads	Miles	Bonds and stocks
1876	30	3,840	$217,848,000
1877	54	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	12	2,629	250,033,000
1910	17	1,100	93,660,109
1911	13	1,386	40,741,543
1912	12	661	25,910,990
1913	6	1,159	86,163,850
1914	9	1,470	83,189,500
1915	11	3,914	285,258,782
1916	26	8,355	703,444,855
1917	20	10,963	557,846,348
1918	11	763	24,735,187
1919	8	459	15,479,587
1920	7	380	7,676,200

The story of the receivership of the Denver & Rio Grande would be in the main a recital of the developments which have taken place in this Western Pacific matter. It is now proposed to reorganize the road under Western Pacific control as the Denver & Rio Grande Western, but the last step in the reorganization cannot be told until a decision is rendered as to the plea of the Denver & Rio Grande stockholders to have a part in the reorganization. The stockholders claim that the decision in the judgment in favor of the Western Pacific was incorrect and the confirmation of the sale of the Denver & Rio Grande on November 20 is withheld pending a decision on this question.



One of Twenty Santa Fe Type Locomotives Built by the American Locomotive Company for the Boston & Maine

Locomotive Orders Show Increase in 1920

Domestic Orders for Year Nine Times Total for Previous Year—Still Far Below Average Annual Purchases

THE LOCOMOTIVES ORDERED by the Class 1 railroads in 1920 reached a total of 1,668—almost eight times the number ordered for all domestic service in 1919. The orders placed by other railroads in the United States amounted to 103 and by industrial concerns to 227, making a total of 1,998 for all domestic purchases—more than nine times the similar total for 1919.

The orders by Canadian roads and industries from builders either in Canada or the United States were 189 and the orders received by American builders from foreign countries amounted to 718, making a grand total for all orders of 2,905. In 1919 the total Canadian orders were 58 and the foreign orders 898. Thus it will be seen that there was a considerable increase in orders from every source except in the export trade. Here the 1920 total is 180 less than the 1919 figure. It will be noticed that the orders for the Class I roads have been compiled separately this year. Included with them are the figures for some of the more important terminal railways.

TABLE I—LOCOMOTIVE ORDERS OF 1920

For Class I Railroads	1,668
For Other American Railroads	103
For Domestic Industrials	227
Total Domestic	1,998
For Service in Canada	189
For Export to other Countries	718
Grand Total	2,905

In last year's review of locomotive statistics (*Railway Age*, January 2, 1920, page 125) it was pointed out that the year 1919 set the low mark for locomotive orders as far back as records have been kept. In view of this fact, the 1920 orders can not be considered excessive, as may easily be seen by reference to Table II. The totals for 1916, 1917 and 1918 all exceed the figures for 1920. The totals for 1917 are as large again as the figures shown in the present compilation. During these years greatly increasing demands on the railways together with a steady upward movement of prices which looked as if it would continue indefinitely brought about an economic condition which generally increases buying in almost every field. Then, too, during the war period it was felt that something approaching an adequate number of locomotives had to be provided regardless of cost, and under the regime of the Railroad Administration government credit was available for such purposes.

The orders this year were financed by the railroads themselves, with some help from the government to be sure, during the period of readjustment attendant upon the return of the carriers to their owners when railway costs were nearing their peak and before adequate returns had been provided by a new rate structure. In view of these facts the showing for 1920 is not entirely unsatisfactory, although it is quite evident that nothing has been done during the past year to make up for deficiencies in the annual purchases of locomotives which have been accumulating since 1912.

It was pointed out in the last statistical number of the *Railway Age* that the foreign orders for 1919 made up more than 75 per cent of all orders placed. In 1920 conditions were quite different, because foreign orders have been small. This decrease in orders from abroad is disappointing; it can be traced to the premium on the dollar which has increased generally throughout the year in most countries and which makes it possible in some cases for foreign manufacturers to underbid our own; to the fact that foreign competitors have been able to increase their production and to direct their efforts once more to their old markets; and to the generally impoverished condition of the countries which most need to replenish the inadequate stock of locomotives on their railways. One of the most noteworthy orders from foreign countries which was placed in the United States during the year was from Roumania for 50 locomotives. This order was divided equally between the Baldwin Locomotive Works and the American Locomotive Company and payment for it was made in petroleum.

TABLE II. ORDERS FOR LOCOMOTIVES SINCE 1901

Domestic orders only

Year	Locomotives	Year	Locomotives
1901	4,340	1908	1,182
1902	4,665	1909	3,350
1903	3,283	1910	3,787
1904	2,538	1911	2,850
1905	6,265	1912	4,515
1906	5,642	1913	3,467
1907	3,482	1914	1,265

Domestic and Foreign

Year	Domestic	Foreign	Total
1915	1,612	850	2,462
1916	2,910	2,983	5,893
1917	2,704	3,438	6,142
1918	2,802	2,086	4,888
1919	272	898	1,170

The number of locomotives built in the United States for domestic service during 1920 was 1,857 and for export 1,582, making a total of 3,439. In Canada the production was 165 for domestic use and 68 for export, making a total of 233

and a grand total of all production in the United States and Canada of 3,672. This figure represents an increase of 400 over the similar total, 3,272, for 1919. The total built in the United States for domestic service in 1920 is some 200 less than the domestic production in 1919, but the figures for the Canadian and export production combine to show a definite increase in the grand total.

It should be pointed out in connection with quoting figures for locomotives exported that, due to the failure of two large locomotive builders to furnish figures showing the number built for export, the editors have had to content themselves with estimating the production of these builders from other sources, which, however, are believed to be sufficiently accurate for purposes of comparison.

If the locomotive orders for the preceding year give any data by which production for the following year may be estimated, we can safely assume that the output of locomotives in 1921 should exceed measurably the production for 1920. The fact confronts us always that American roads have for several years fallen far behind in their acquisition of new motive power and that sooner or later the deficiency must be made good. If there is to be an increase in locomotive production in 1921, then, it is a matter which should meet with the approval of all—the public and the railways themselves as well as the locomotive builders.

The locomotive orders which are listed in the accompanying tables are compiled from official sources. Some few omissions of small and unimportant orders doubtless occur. The data presented herewith were supplied by the railways, the industrial concerns and the manufacturers in reply to letters which we sent asking for the information. The lists were checked with the weekly reports in the Equipment and Supplies column of the *Railway Age* and amplified where necessary.

TABLE III. THE LOCOMOTIVES BUILT

	United States	Canada	Total
Domestic	1,857	165	2,022
Foreign	1,582	68	1,650
Total	3,439	233	3,672

Comparison with Previous Years

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	866	309	1,176	1908*	1,886	456	2,342
1897	865	386	1,251	1909*	2,596	291	2,887
1898	1,321	554	1,875	1910*	4,441	314	4,755
1899	1,951	514	2,475	1911*	3,143	387	3,530
1900	2,648	505	3,153	1912†	4,403	512	4,915
1901	...	...	3,384	1913†	4,561	771	5,332
1902	...	...	4,070	1914†	1,962	273	2,235
1903	...	...	5,152	1915†	1,250	835	2,085
1904	...	...	3,441	1916†	2,708	1,367	4,075
1905*	4,896	595	5,491	1917†	2,585	2,861	5,446
1906*	6,232	720	6,952	1918†	3,668	2,807	6,475
1907*	6,564	798	7,362	1919†	2,162	1,110	3,272

*Includes Canadian output.
†Includes Canadian output and equipment built in railroad shops.

Locomotive Orders in 1920

Class I Roads

Purchaser	No.	Type	Cylinders	Weight	Superheater	Brick arch	Valve gear	Mechanical stoker	Builder
Ann Arbor	2	0-8-0	22½ x 28	200,000	No	Yes	Walschaert	.....	American
Atchison, Topeka & Santa Fe	30	2-8-2	27 x 32	322,920	Yes	Yes	Walschaert	Duplex	Baldwin
	10	2-10-2	30 x 32	375,400	Yes	Yes	Walschaert	Duplex	Baldwin
	10	4-8-2	28 x 28	338,310	Yes	Yes	Walschaert	Duplex	Baldwin
Atlanta & West Point	2	4-8-2	27 x 28	316,000	Yes	...	.....	.....	American
Atlantic Coast Line	25	4-6-2	25 x 28	277,000	Yes	Yes	Baker	.....	American
	5	0-6-0	21 x 28	163,600	No	Yes	Baker	.....	Baldwin
Baltimore & Ohio	50	2-8-2	26 x 32	300,000	Yes	Yes	Baker	Duplex	Baldwin
Bangor & Aroostook	6	2-8-0	23 x 30	212,000	Yes	Yes	Baker	.....	American
Boston & Albany	6	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
Boston & Maine	20	2-10-2	29 x 32	361,200	Yes	Yes	Walschaert	Duplex	American
Chicago & Alton	5	2-8-2	26 x 30	292,000	Yes	...	.....	.....	American
Central of Georgia	7	4-8-2	27 x 28	316,000	Yes	Yes	Walschaert	.....	American
	6	2-6-6-2	24-38 x 32	438,000	Yes	...	.....	.....	American
Central of New Jersey	11	2-8-2	27 x 32	337,000	Yes	...	.....	.....	American
Chesapeake & Ohio	20	2-6-6-2	21-35 x 32	441,000	Yes	Yes	Walschaert	Duplex	American
	5	0-10-0	27 x 28	295,000	Yes	Yes	Walschaert	.....	American
Chicago & Alton	5	2-8-0	26 x 30	292,000	Yes	Yes	Walschaert	Duplex	American
Chicago & North Western	20	4-6-2	25 x 28	260,000	Yes	Yes	Young	.....	American
	40	2-8-2	27 x 32	302,000	Yes	Yes	Young	.....	American
Chicago, Burlington & Quincy	15	2-10-2	30 x 27	367,830	Yes	Yes	Walschaert	Duplex	Baldwin
	16	2-8-2	27 x 32	277,000	Yes	Yes	Walschaert	.....	Baldwin
	15	0-6-0	21 x 28	163,500	No	Yes	Baker	.....	Baldwin
	5	2-8-2	28 x 32	318,700	Yes	Yes	.....	.....	Baldwin
Chicago Great Western	10	2-8-2	27 x 30	284,400	Yes	Yes	.....	.....	Baldwin
Chicago, Milwaukee & St. Paul	100	2-8-2	26 x 30	287,600	Yes	Yes	Baker	Duplex	Baldwin
Chicago, Rock Island & Pacific	10	4-8-2	28 x 28	340,000	Yes	Yes	Baker	.....	American
	15	2-10-2	30 x 32	383,000	Yes	Yes	Baker	Duplex	American
	10	2-8-2	28 x 30	322,000	Yes	Yes	Baker	.....	American
Chicago, St. Paul, Minn. & Omaha	6	2-8-2	27 x 32	320,000	Yes	...	.....	.....	American
	4	0-6-0	21 x 28	164,000	...	...	.....	.....	American
Cleveland, Cin., Chicago & St. Louis	10	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
	10	4-6-2	23½ x 26	282,000	Yes	Yes	.....	.....	American
	50	2-8-2	27 x 30	328,000	Yes	Yes	.....	.....	American
Delaware & Hudson	1	2-8-2	24-42 x 32	340,000	Yes	Yes	Young	.....	American
Delaware, Lackawanna & Western	6	4-6-2	25 x 28	302,000	Yes	Yes	Baker	.....	American
	10	2-8-2	28 x 30	321,000	Yes	Yes	Baker	Duplex	American
El Paso & Southwestern	10	2-8-2	29 x 30	319,000	Yes	Yes	Walschaert	Duplex	American
Florida East Coast	10	4-6-2	22 x 26	204,000	Yes	Yes	Walschaert	.....	American
	2	0-6-0	20 x 26	160,000	Yes	Yes	Walschaert	.....	American
Fort Smith & Western	1	2-8-2	22 x 28	206,900	Yes	Yes	.....	.....	Baldwin
Grand Trunk (Western)	25	0-6-0	22 x 26	174,000	Yes	Yes	Baker	.....	Lima
	1	4-6-2	.....	.....	...	...	.....	.....	Company shops
Great Northern	45	2-8-2	28 x 32	320,000	Yes	Yes	Walschaert	Duplex	Baldwin
Green Bay & Western	1	0-6-0	19 x 26	128,000	Yes	No	Walschaert	.....	American
Gulf Coast Lines	5	4-6-0	21½ x 26	191,000	Yes	...	Walschaert	.....	American
Gulf, Mobile & Northern	4	2-8-2	22 x 28	205,800	Yes	No	Walschaert	.....	Baldwin
Illinois Central	50	2-10-2	30 x 32	380,000	Yes	Yes	Baker	Duplex	Lima
	25	4-6-2	26 x 28	278,000	Yes	Yes	Walschaert	.....	American
	50	2-10-2	30 x 32	380,000	Yes	Yes	Baker	Duplex	Lima
	25	0-8-0	25 x 28	216,000	Yes	Yes	Baker	.....	Baldwin
Illinois Terminal	2	2-6-0	22 x 26	173,000	...	...	.....	.....	Baldwin
Indiana Harbor Belt	10	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
Lehigh Valley	5	2-8-2	27 x 30	325,000	Yes	Yes	Baker	Duplex	Baldwin
Los Angeles & Salt Lake	10	2-8-2	26 x 28	300,000	Yes	Yes	.....	Duplex	American
	4	0-6-0	21 x 26	.....	Yes	Yes	.....	.....	Baldwin
Midland Valley	2	2-8-2	22 x 28	200,500	Yes	Yes	.....	.....	Baldwin
Louisiana & Arkansas	2	4-6-0	22 x 28	194,000	Yes	...	Walschaert	.....	.....
	2	4-6-0	22 x 28	190,500	Yes	...	Walschaert	.....	Baldwin
Louisville & Nashville	2	0-6-0	21 x 28	173,550	Yes	Yes	Walschaert	.....	Am. Ry. & Eq.
	15	2-8-2	26 x 30	292,000	Yes	Yes	Walschaert	Duplex	American
	6	0-8-0	23½ x 30	219,000	Yes	Yes	Walschaert	.....	Company shops
	6	4-6-2	22 x 28	235,400	Yes	Yes	Walschaert	.....	Company shops
	12	4-6-2	22 x 28	235,400	Yes	Yes	Walschaert	.....	Company shops
	16	2-8-2	28 x 30	324,000	Yes	Yes	Walschaert	Duplex	Company shops
	6	0-8-0	23½ x 30	219,000	Yes	Yes	Walschaert	.....	Company shops

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Maine Central	4	4-6-0	22 x 28	206,500	Yes	Yes	Baker	.....	American
	4	0-6-0	21 x 28	165,000	Yes	Yes	Walschaert	.....	American
Michigan Central	6	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
	10	4-6-2	23½ x 26	282,000	Yes	Yes	.....	.....	American
	10	2-8-2	27 x 30	328,000	Yes	Yes	.....	.....	American
Minneapolis & St. Louis	15	2-8-2	24 x 30	262,000	Yes	Yes	Baker	.....	American
	5	4-6-2	22 x 28	223,000	Yes	Yes	Baker	.....	American
Minneapolis, St. Paul & Sault Ste. Marie	25	2-8-2	28 x 30	294,000	Yes	Yes	Walschaert	.....	American
	5	0-6-0	20 x 26	151,000	Yes	Yes	Walschaert	.....	American
Missouri, Kansas & Texas	10	0-8-0	25 x 28	220,000	Yes	Yes	Baker	.....	Lima
	10	0-8-0	25 x 28	220,000	Yes	No	Baker	.....	Lima
	10	4-6-2	25 x 28	272,000	Yes	No	Walschaert	.....	Lima
	20	2-8-2	28 x 30	315,000	Yes	No	Walschaert	.....	Lima
Missouri Pacific	5	0-6-0	21 x 28	165,000	Yes	...	.....	.....	American
	25	2-8-2	27 x 32	325,000	Yes	...	.....	.....	American
Missouri Pacific	15	0-6-0	21 x 28	165,000	Yes	...	.....	.....	American
	5	4-8-2	27 x 30	345,000	Yes	...	.....	.....	American
	5	4-6-2	26 x 26	265,000	Yes	...	.....	.....	American
New York Central	50	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
	26	4-6-2	23½ x 26	282,000	Yes	Yes	.....	.....	American
	3	0-8-8-0	26-40 x 28	468,000	Yes	Yes	.....	.....	American
	10	2-6-6-2	21½-34 x 32	364,000	Yes	Yes	.....	.....	American
New York, Chicago & St. Louis	6	2-8-2	26 x 30	292,000	Yes	Yes	Walschaert	Duplex	Lima
New York, New Haven & Hartford	30	4-8-2	27 x 30	327,000	Yes	Yes	Southern	Duplex	American
	10	0-8-0	25 x 28	214,000	Yes	Yes	Baker	.....	American
Norfolk & Western	10	4-8-2	.....	.....	...	...	.....	.....	Company shops
Norfolk Southern	3	0-6-0	19 x 28	146,000	No	Yes	Baker	.....	Baldwin
Northern Pacific	20	4-6-2	26 x 28	296,000	Yes	Yes	Walschaert	.....	American
	25	2-8-2	28 x 30	336,000	Yes	Yes	Walschaert	.....	American
	20	0-8-0	25 x 28	214,000	Yes	Yes	Walschaert	.....	American
	6	2-8-8-2	26-40 x 30	476,000	Yes	Yes	Walschaert	.....	American
Northern Pacific Terminal	2	0-6-0	20 x 26	152,000	Yes	...	.....	.....	American
Pennsylvania	1	2-6-0	13 x 20	51,500	No	No	Richardson	.....	American
	1	0-4-0	9 x 14	24,900	...	...	.....	.....	Baldwin
Pere Marquette	12	4-6-2	23 x 28	240,000	Yes	Yes	Baker	.....	American
Philadelphia & Reading	5	4-6-2	25 x 28	273,600	Yes	No	Walschaert	.....	Company shops
	5	0-6-0	20 x 26	156,000	No	No	Walschaert	.....	Company shops
	25	2-8-0	25 x 32	279,390	Yes	No	Walschaert	Duplex	Baldwin
Pittsburgh & Lake Erie	5	2-8-2	27 x 30	319,000	Yes	Yes	.....	.....	American
Pittsburgh & Shawmut	2	4-4-2	19 x 26	173,000	Yes	No	Walschaert	.....	American
Pittsburgh & West Virginia	6	2-8-0	25 x 32	238,000	Yes	...	.....	.....	American
Portland Terminal	2	0-6-0	21 x 28	167,000	Yes	...	.....	.....	American
Richmond, Fredericksburg & Potomac	2	4-6-0	26 x 28	285,000	Yes	Yes	Walschaert	.....	American
	2	0-6-0	21 x 28	172,000	Yes	Yes	Walschaert	.....	American
St. Louis Southwestern	1	2-8-0	25 x 30	241,000	Yes	Yes	.....	.....	Baldwin
	21	2-8-0	25 x 30	243,000	Yes	Yes	Baker	.....	Baldwin
Southern Pacific	10	2-8-2	.....	.....	...	...	.....	.....	Company shops
	6	4-6-0	.....	.....	...	...	.....	.....	Company shops
	14	0-6-0	.....	.....	...	...	.....	.....	Company shops
	15	2-10-2	.....	.....	...	...	.....	.....	Baldwin
	15	4-6-2	.....	.....	...	...	.....	.....	Baldwin
	10	0-6-0	.....	.....	...	...	.....	.....	Baldwin
	2	Electric	.....	120,000	...	...	.....	.....	Westinghouse
Union	6	0-6-0	22 x 28	178,000	Yes	Yes	.....	.....	Baldwin
Union Pacific	25	2-10-2	29½ x 30	368,500	Yes	Yes	Walschaert	Duplex	Baldwin
	10	4-6-2	25 x 28	278,100	Yes	Yes	Walschaert	.....	Baldwin
	19	2-8-8-0	26-41 x 32	494,500	Yes	Yes	Walschaert	Duplex	American
	16	2-8-2	26 x 28	294,000	Yes	Yes	Walschaert	Duplex	American
	30	0-6-0	21 x 26	156,000	Yes	Yes	Walschaert	.....	Lima
Utah	2	2-10-2	29½ x 30	365,500	Yes	Yes	Walschaert	Duplex	Baldwin
Virginian	6	4-6-2	26 x 28	288,000	Yes	Yes	Baker	Duplex	American
Western Maryland	20	2-8-0	27 x 32	296,000	Yes	Yes	Walschaert	Standard	Baldwin
	20	2-8-0	27 x 32	296,000	Yes	Yes	Walschaert	Standard	Baldwin
Western Pacific	5	2-8-2	27 x 32	320,000	Yes	Yes	Walschaert	Standard	American
	5	2-8-2	28 x 30	330,000	Yes	Yes	Walschaert	.....	American

Other Railroads

Abilene & Southern	1	4-6-0	18 x 24	126,000	Yes	Yes	Walschaert	.....	Baldwin
Akron, Canton & Youngstown	2	2-8-0	25 x 28	214,000	Yes	...	.....	.....	American
Aurora, Elgin & Chicago	1	Electric	600 v., d. c.	100,000	...	...	.....	.....	General Electric
Bay Terminal	1	Switch	19 x 24	124,000	No	Yes	Baker	.....	Baldwin
Bamberger Electric	1	Electric	.....	82,540	...	...	.....	.....	Company shops
Bevier & Southern	1	2-6-0	20 x 26	137,000	...	...	.....	.....	Baldwin
Birmingham Southern	2	2-8-0	23 x 28	205,000	Yes	...	.....	.....	American
Cairo, Truman & Southern	1	Geared	.....	94,000	...	...	.....	.....	Heisler
California Western & Nav. Co	1	2-6-2	18 x 24	140,000	Yes	No.	Walschaert	.....	Baldwin
Cambria & Indiana	2	2-8-0	23 x 32	238,500	Yes	Yes	Walschaert	.....	Baldwin
Charlotte Harbor & Northern	4	2-8-0	21 x 28	175,600	Yes	No	Walschaert	.....	Baldwin
Chicago Heights Terminal Transfer	1	0-6-0	22 x 26	160,900	...	...	.....	.....	Baldwin
Chicago, West Pullman & Southern	1	0-6-0	23 x 28	178,200	Yes	No	Young	.....	Baldwin
Cisco Southeastern	1	4-6-0	18 x 26	126,000	Yes	...	.....	.....	Baldwin
Columbia & Nehalem River	1	2-6-2	18 x 24	130,606	No	Yes	Walschaert	.....	Baldwin
Columbia, Newberry & Laurens	1	2-8-0	21 x 26	161,000	Yes	Yes	Walschaert	.....	Baldwin
Cornwall	2	0-6-0	21 x 28	162,000	...	...	.....	.....	American
Deering Southwestern	1	4-6-0	16 x 24	101,000	...	...	.....	.....	Baldwin
Delray Connecting	1	0-8-0	22 x 28	208,000	Yes	Yes	Walschaert	.....	American
Des Moines Union	3	0-6-0	21 x 26	138,700	...	...	.....	.....	Baldwin
East Broad Top	1	2-8-2	20 x 24	161,000	Yes	...	.....	.....	Baldwin
East Jersey R.R. & Terminal	1	0-6-0	19 x 24	127,700	No	No	.....	.....	Baldwin
East Jordan & Southern	1	2-6-0	18 x 24	121,000	No	Yes	.....	.....	American
Escambia	1	4-6-0	18 x 24	100,000	No	No	Walschaert	.....	Baldwin
Eureka Nevada	1	0-8-0	14 x 18	68,000	No	Yes	Walschaert	.....	Porter
Fairport, Painesville & Eastern	1	0-6-0	22 x 26	156,000	Yes	Yes	.....	.....	Baldwin
Hagerstown & Frederick	1	Electric	.....	52,400	...	...	.....	.....	Company shops
Hetch Hetchy	1	2-6-2	18 x 24	127,000	Yes	...	.....	.....	American
Interstate	1	2-8-0	25 x 32	222,600	Yes	Yes	Southern	.....	Baldwin
Jacksonville Terminal	2	0-6-0	20 x 26	127,000	...	...	.....	.....	Baldwin
Jonesboro, Lake City & Eastern	2	2-8-0	19 x 24	134,000	Yes	...	.....	.....	Baldwin
Kansas City, Kaw Valley & Western	2	Electric	.....	100,000	...	...	.....	.....	Bald. - West'house
Kentucky & Indiana Terminal	3	0-8-0	24 x 28	209,000	Yes	...	.....	.....	Baldwin
Lake Erie, Franklin & Clarion	1	2-8-0	22 x 28	181,000	...	...	.....	.....	Baldwin
	1	4-4-0	19 x 24	128,000	...	...	.....	.....	Baldwin
Manufacturers' Junction	1	0-6-0	22 x 26	160,000	...	...	.....	.....	Baldwin
Minn, Northfield & So	2	2-6-0	21 x 26	136,000	No	Yes	Walschaert	.....	Porter
Mississippi River & Bonne Terre	2	2-8-0	23 x 28	199 000	Yes	No	.....	.....	American
Monongahela Valley Traction	1	Electric	.....	100,000	...	...	.....	.....	Bald. - West'house
Montana, Wyoming & Southern	1	2-8-0	21 x 28	175,000	Yes	Yes	.....	.....	Baldwin
Mount Hood	1	2-8-2	18 x 24	135,000	...	...	.....	.....	Baldwin
Newburg & South Shore	2	0-6-0	22 x 28	178,000	Yes	Yes	Walschaert	.....	Baldwin
	2	0-8-0	24 x 30	221,700	Yes	Yes	Walschaert	.....	Baldwin
New Orleans Public Belt	3	0-6-0	19 x 24	130,000	Yes	Yes	.....	.....	Baldwin
New York Municipal	1	Electric	600 v., d. c.	100,000	...	...	.....	.....	General Electric
Norfolk & Portsmouth Belt Line	2	2-8-0	21 x 28	169,000	Yes	...	.....	.....	Baldwin

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Northeast Oklahoma	2	Electric	.....	100,000	...	...	.....	.....	Bald. - West'house
Northwestern Elevated	2	Electric	.....	100,000	...	...	.....	.....	Bald. - West'house
Norwood & St. Lawrence	1	2-6-0	19 x 24	122,400	...	...	.....	.....	Baldwin
Pittsburgh, Allegheny & McKee's Rocks	1	0-6-0	20 x 26	140,000	No	No	Walschaert	.....	Porter
Portland, Astoria & Pacific	3	2-8-2	20 x 28	174,000	...	...	.....	.....	American
Sewell Valley	1	2-8-2	20½ x 28	183,700	...	Yes	.....	.....	Baldwin
Sierra Ry. of California	1	2-8-0	18 x 22	121,000	...	...	.....	.....	Baldwin
South Buffalo	2	0-6-0	20 x 26	154,000	Yes	...	.....	.....	American
	1	0-8-0	22 x 28	209,000	Yes	...	.....	.....	American
South Shore	1	0-6-0	22 x 26	152,000	...	...	.....	.....	Baldwin
Sugarland Railway	1	4-6-0	18 x 26	126,000	...	...	.....	.....	Baldwin
Sumpter Valley	2	2-8-2	19 x 20	128,000	...	...	.....	.....	American
Texas, Oklahoma & Eastern	1	2-6-2	16 x 24	104,500	...	Yes	.....	.....	Baldwin
	1	4-6-0	20 x 26	168,000	Yes	Yes	.....	.....	American
Texas-Southeastern	1	4-6-0	19 x 26	135,000	Yes	Yes	Walschaert	.....	Baldwin
Tidewater Southern	1	Electric	1,500 v., d. c.	120,000	...	...	.....	.....	General Electric
Toledo Terminal	2	0-6-0	21 x 26	142,000	Yes	Yes	Walschaert	.....	American
	4	2-8-0	22 x 28	200,000	Yes	Yes	Walschaert	.....	American
Townville	1	2-6-0	13 x 20	60,000	...	...	.....	.....	Baldwin
Verde Tunnel & Smelter	2	2-6-6-2	23½ x 37	448,000	Yes	Yes	Walschaert	.....	American
Wisconsin & Michigan	2	4-6-0	20 x 26	140,000	No	Yes	Walschaert	.....	Baldwin
Washington & Old Dominion	1	Electric	.....	100,000	...	...	.....	.....	Bald. - West'house
Virginia & Carolina Southern	1	4-6-0	18 x 26	126,000	...	...	.....	.....	Baldwin
Youngstown & Sub	1	Electric	.....	90,000	...	...	.....	.....	Bald. - West'house

Industrials

Alaskan Engineering Comm	1	4-6-0	14 x 20	77,600	...	...	.....	.....	Baldwin
Albert Hanson Lumber Co	1	0-4-0	15 x 24	70,000	...	...	.....	.....	Baldwin
Alger-Sullivan Lumber Co	1	4-6-0	18 x 24	117,000	...	...	.....	.....	Baldwin
Allegheny River Mining Co	2	4-4-2	19 x 26	173,000	Yes	...	.....	.....	American
Allegheny Steel Co	1	0-6-0	22 x 26	160,000	...	...	.....	.....	Baldwin
American Agricultural Chemical Co	1	0-4-0	13 x 20	65,000	...	...	.....	.....	American
American Bridge Co	1	0-4-0	11 x 16	44,600	...	...	.....	.....	Baldwin
American Locomotive Co	1	0-6-0	21 x 28	168,000	Yes	...	.....	.....	American
American Steel & Wire Co	1	0-6-0	21 x 26	137,900	...	...	.....	.....	Baldwin
Anderson-Theobald Co	1	0-6-0	16 x 24	85,000	...	...	.....	.....	Baldwin
Arkansas Land & Lumber Co	1	2-6-2	16 x 24	102,500	...	...	.....	.....	Baldwin
Arkansas Short Leaf Lumber Co	1	2-6-2	16 x 24	122,000	Yes	...	.....	.....	Baldwin
Ashland Iron Mining Co	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Astoria Light, Heat & Power Co	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Atlantic Steel Co	1	0-4-0-T	14 x 22	79,000	...	...	.....	.....	American
Baldwin	6	0-4-0	14 x 22	77,500	...	...	.....	.....	Baldwin
	4	0-4-0	10 x 16	37,000	...	...	.....	.....	Baldwin
Barfield Lumber Co	1	2-6-2	13 x 22	76,400	...	...	.....	.....	Baldwin
Bee Tree Lumber Co	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Birmingham Slag Co	2	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Beech Bottom Power Co	1	0-6-0	17 x 24	88,000	...	...	.....	.....	Baldwin
	1	0-4-0	11 x 16	46,600	...	...	.....	.....	Baldwin
Board of State Harbor Com., San Francisco	1	0-6-0	20 x 24	146,000	...	...	.....	.....	American
Bohlessen, H. G., Mfg. Co	1	2-6-2	15 x 24	93,000	Yes	...	.....	.....	Baldwin
Brown, Geo. C., & Co	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Brown, W. P., & Sons Lumber Co., Inc	1	2-6-0	14 x 22	74,500	...	...	.....	.....	Baldwin
Buckwalter, J. R., Lumber Co	1	2-6-2	16 x 24	101,000	...	...	.....	.....	Baldwin
Buffalo Slag Co	2	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Bureau of Water, Philadelphia	1	0-4-0	17 x 24	100,000	...	...	.....	.....	Baldwin
Calcasieu Long Leaf Lumber Co	1	2-6-2	17 x 24	130,000	Yes	...	.....	.....	Baldwin
Cambria Steel Co	2	0-8-0	27 x 30	270,000	...	...	.....	.....	Baldwin
Camp Mfg. Co	1	2-6-0	13 x 20	57,000	...	...	.....	.....	American
Carnegie Steel Co	2	.....	.....	.....	...	...	.....	.....	Baldwin
Casey Co., John F	2	0-4-0	10 x 16	37,000	...	...	.....	.....	Baldwin
Central Leather Co	2	0-4-0	13 x 20	65,000	...	...	.....	.....	American
Charcoal Iron Co	1	2-8-0	18 x 24	124,000	...	...	.....	.....	American
Capilano Timber Co	1	Geared	.....	106,000	...	...	.....	.....	Heisler
Chehallis Mill Co	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Chino Copper Co	3	0-6-0	21 x 26	157,000	Yes	...	.....	.....	American
Colonial Steel Co	1	0-6-0	18 x 24	121,000	...	...	.....	.....	Baldwin
Colorado Portland Cement Co	1	0-4-2	14 x 22	84,000	...	...	.....	.....	American
Columbia Chemical Co	1	.....	.....	.....	...	...	.....	.....	Vulcan
Cornwall Ore Bank Co	2	2-6-0	23 x 26	180,700	...	...	.....	.....	Baldwin
Coronet Phosphate Co	1	0-4-2	14 x 22	88,000	...	...	.....	.....	American
Crowell & Spencer Lumber Co., Ltd	1	4-6-0	19 x 26	139,900	Yes	...	.....	.....	Baldwin
	1	2-6-2	15 x 24	92,000	...	...	.....	.....	Baldwin
Dawkins Lumber Co	1	Geared	.....	106,000	...	...	.....	.....	Heisler
Dempsey Lumber Co	1	Geared	.....	150,000	...	...	.....	.....	Heisler
Desha Lumber Co	1	Geared	.....	80,000	...	...	.....	.....	Heisler
Diamond Match Co	1	Switch	.....	.....	...	...	.....	.....	Bell
Donner Steel Co	1	0-6-0	21 x 26	144,000	...	...	.....	.....	American
	2	2-4-0	14 x 22	79,000	...	...	.....	.....	American
Eastman Kodak Co	1	0-6-0	28 x 24	148,400	...	...	.....	.....	Baldwin
Eastern Steel Co	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Empire Steel & Iron Co	1	2-6-0	20 x 26	153,200	...	...	.....	.....	Baldwin
English Lumber Co	1	2-8-2	20½ x 28	175,500	...	...	.....	.....	Baldwin
Frick, H. C., Coke Co	1	0-4-0-T	14 x 22	79,000	...	...	.....	.....	American
Frost Johnson Lumber Co	1	2-6-2	16 x 24	107,800	...	...	.....	.....	Baldwin
Gayoso Lumber Co	2	Geared	.....	72,000	...	...	.....	.....	Heisler
Goodyear Tire & Rubber Co	1	0-6-0	22 x 26	160,000	...	...	.....	.....	Baldwin
Gordon Mining Co	1	0-6-0	20 x 24	126,000	...	...	.....	.....	Baldwin
Grace, W. R., & Co	1	0-4-0	11 x 16	39,000	...	...	.....	.....	American
Hartford Electric Light Co	1	0-4-0	13 x 20	65,000	...	...	.....	.....	American
Holly Ridge Lumber Co	1	Geared	.....	44,000	...	...	.....	.....	Heisler
Independence Logging Co	1	Geared	.....	150,000	...	...	.....	.....	Heisler
Inland Steel Co	2	0-6-0	20 x 24	137,000	Yes	...	.....	.....	American
Interstate Sand & Gravel Co	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Johnson, G. W., Limestone Co	2	0-4-0	12 x 18	53,000	...	...	.....	.....	American
Jones & Laughlin Steel Co	1	0-6-0	22 x 26	160,000	...	...	.....	.....	Baldwin
Jones, J. M., Lumber Co	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Kentucky Lumber Co	1	2-6-2	15 x 20	85,900	...	...	.....	.....	Baldwin
Kelsey Wheel Co	1	Geared	.....	72,000	...	...	.....	.....	Heisler
Kipawa Co	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Koppers Co	1	0-6-0	18 x 24	120,000	...	...	.....	.....	Baldwin
	2	0-4-0	14 x 22	79,000	...	...	.....	.....	American
	2	0-4-0	16 x 24	99,000	...	...	.....	.....	American
	1	0-6-0	19 x 26	121,000	...	...	.....	.....	American
Lake Superior Paper Co	1	0-6-0	19 x 24	123,000	...	...	.....	.....	American
Lehigh Portland Cement Co	1	0-4-0	10 x 16	38,000	...	...	.....	.....	American
	2	0-4-0	12 x 18	53,000	...	...	.....	.....	American
	1	0-4-0	13 x 20	66,000	...	...	.....	.....	American
Lewis & Clark	1	Geared	.....	126,000	...	...	.....	.....	Heisler
Log Supply Co	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Long Bell Co	1	2-6-0	18 x 24	112,000	...	...	.....	.....	Baldwin
Longville Lumber Co	1	2-6-2	17 x 24	130,000	Yes	...	.....	.....	Baldwin
Mansfield Sheet & Tin Plate Co	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Mengel Box Co.	2	2-4-2	14 x 22	73,000	...	...	.....	.....	Baldwin
	1	2-4-2	14 x 22	73,000	...	...	.....	.....	Baldwin
Meredith Lumber Co.	1	2-6-2	15 x 24	92,000	...	...	.....	.....	Baldwin
Minnesota Steel Co.	1	0-6-0	22 x 26	166,400	...	...	.....	.....	Baldwin
Missabe Iron Co.	3	0-6-0	21 x 26	157,000	Yes	...	.....	.....	American
Mississippi State Insane Hospital	1	0-6-0	17 x 24	88,000	...	...	.....	.....	Baldwin
New Jersey Zinc Co.	1	0-6-0	21 x 26	146,000	...	...	.....	.....	Baldwin
Nickel Plate Gravel Co.	1	0-4-0	12 x 18	53,000	...	...	.....	.....	American
Nickey Bros.	1	Geared	.....	44,000	...	...	.....	.....	Heisler
North Steel Co.	1	0-4-0	16 x 24	65,000	...	...	.....	.....	American
Norton Co.	1	0-6-0	19 x 24	123,000	.	...	.....	.....	Baldwin
Old Ben Coal Co.	2	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Oil Well Supply Co.	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Oregon Lumber Co.	3	2-8-2	20 x 28	174,000	...	...	.....	.....	American
Otis Steel Co.	1	0-6-0	22 x 26	160,000	...	...	.....	.....	Baldwin
	1	0-6-0	19 x 26	140,000	...	...	.....	.....	Lima
Pelican Bay Lumber Co.	1	2-6-2	19 x 26	146,000	Yes	...	.....	.....	American
Petosky Portland Cement Co.	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Phelps Dodge Corporation	2	Switch	.....	.....	...	...	.....	.....	Porter
Pittsburgh Limestone Co.	1	0-4-0	10 x 16	39,000	...	...	.....	.....	American
Pittsburgh Plate Glass Co.	1	0-6-0	18 x 24	105,000	...	...	.....	.....	Baldwin
Pittsburgh Seamless Tube Co.	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Poinsette Lumber & Mfg. Co.	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Prettyman, J. F., & Sons	1	2-6-2	14 x 22	88,400	...	...	.....	.....	Baldwin
Primrose Coal Producing Co.	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Ransom & Benedict	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Railway Steel Spring Co.	1	0-6-0	17 x 24	118,000	...	...	.....	.....	American
Republic Iron & Steel Co.	1	0-4-0	13 x 20	65,000	...	...	.....	.....	American
Riverside Portland Cement Co.	1	0-6-0	18 x 24	128,000	...	...	.....	.....	American
Rodman Lumber Co.	1	2-6-0	16 x 24	98,800	...	...	.....	.....	Baldwin
Roebling's, J. A., Sons Co.	1	0-4-0	13 x 20	53,000	...	...	.....	.....	Baldwin
Robesonia Iron Co., Ltd.	1	0-6-0	19 x 26	121,000	...	...	.....	.....	American
Rogers-Brown Iron Co.	1	0-6-0	19 x 26	121,000	...	...	.....	.....	Baldwin
Roper, J. L., Lumber Co.	1	2-8-0	19 x 24	126,300	...	...	.....	.....	Baldwin
St. Louis Coke Chemical Co.	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Santee Timber Co.	1	2-6-2	13 x 22	72,800	...	...	.....	.....	Baldwin
Sartin Lumber Co.	1	2-6-2	12 x 18	62,000	...	...	.....	.....	Baldwin
Sawyer Goodman Co.	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Shenango Furnace Co.	1	0-6-0	22 x 26	160,000	...	...	.....	.....	Baldwin
Simmons Co.	1	0-4-0	18 x 24	104,000	...	...	.....	.....	Baldwin
Simpson Logging Co.	1	2-8-2	16 x 22	124,000	...	...	.....	.....	Baldwin
Singer Mfg. Co.	2	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Solvay Process Co.	2	0-4-0	13 x 20	65,000	...	...	.....	.....	American
	2	0-8-0	22 x 28	208,000	Yes	...	.....	.....	American
	1	0-4-0	13 x 20	65,000	...	...	.....	.....	American
Standard Oil Co. of Indiana	5	2-8-2	26 x 30	292,000	Yes	...	.....	.....	American
Standard Oil Co. of Louisiana	1	0-6-0	19 x 24	123,000	...	...	.....	.....	Baldwin
Standard Oil Co. of New Jersey	1	0-6-0	19 x 24	109,300	...	...	.....	.....	Baldwin
	1	0-6-0	21 x 26	146,000	...	...	.....	.....	Baldwin
Standard Oil Co. of New York	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Standard Slag Co.	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Standard Tank Car Co.	1	0-6-0	.....	.....	...	...	.....	.....	Porter
Stark, Jas. E., & Co.	2	Geared	.....	64,000	...	...	.....	.....	Heisler
Steel & Tube Co. of America	1	0-6-0	19 x 22	118,900	Yes	Yes	.....	.....	Baldwin
Stevensville-Desdemona Oil Ry. (Tex.)	6	.....	.....	.....	...	...	.....	.....	Bell
	2	.....	.....	.....	...	...	.....	.....	Bell
Stimson, J. V., Hardwood Co.	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Sun Company	1	0-6-0	19 x 24	123,100	...	...	.....	.....	Baldwin
Sun Shipbuilding Co.	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Surry Lumber Co.	2	2-6-2	12 x 18	57,000	...	...	.....	.....	Baldwin
Tennessee Coal, Iron & R.R. Co.	4	0-6-0	22 x 26	167,000	Yes	...	.....	.....	American
Texas Pacific Coal & Oil Co.	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Tionesta Valley Ry. Co.	1	Geared	.....	80,000	...	...	.....	.....	Heisler
Trumbull Steel Co.	1	0-6-0	22 x 26	160,000	...	...	.....	.....	Baldwin
U. S. Ferro Alloys Corp.	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Valley Camp Coal Co.	1	0-8-0	22 x 28	210,000	Yes	...	.....	.....	American
Virginia Anthracite Coal Corp.	2	0-6-0	13 x 18	65,000	...	...	.....	.....	Baldwin
Vredenburg Saw Mill Co.	1	2-8-0	19 x 24	134,400	...	...	.....	.....	Baldwin
Wagner Electric Mfg. Co.	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Wausau Southern Lumber Co.	1	2-6-0	19 x 24	129,900	...	...	.....	.....	Baldwin
Weed Lumber Co.	1	2-6-2	17 x 24	123,000	...	...	.....	.....	Baldwin
Weller Construction Co.	1	0-4-0	.....	.....	...	...	.....	.....	Bell
Wesselhoeft & Poor	2	2-4-2	9 x 14	35,000	...	...	.....	.....	American
	1	2-4-2	.....	46,000	...	...	.....	.....	American
West Construction Co.	2	0-4-0	.....	.....	...	...	.....	.....	Bell
Westinghouse Electric & Mfg. Co.	1	0-6-0	19 x 24	119,000	...	...	.....	.....	Baldwin
West Penn Power Co.	1	0-4-0	16 x 24	99,000	...	...	.....	.....	American
White, A. C.	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Whitehead Bros. Co.	1	0-4-0	9 x 14	29,000	...	...	.....	.....	American
Wilcox, I. B., & Co.	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Wind River Lumber Co.	1	2-6-2	14 x 18	84,000	...	...	.....	.....	Baldwin
Winston-Dear Co.	2	0-6-0	21 x 26	138,700	...	...	.....	.....	Baldwin
	2	0-6-0	21 x 26	160,000	...	...	.....	.....	American
Wisconsin-Alabama Lumber Co.	1	Geared	.....	170,000	...	...	.....	.....	Heisler
Wisconsin Logging & Timber Co.	1	2-8-2	19 x 24	177,400	...	...	.....	.....	Baldwin
Railroads and Other Companies in Canada									
Algoma Eastern	2	2-8-0	23½ x 30	242,000	Yes	Yes	Walschaert	.....	Montreal
Anglo-Newfoundland Dev. Co., Ltd.	1	4-6-0	17 x 22	91,000	...	...	.....	.....	Baldwin
	1	2-6-2	15 x 22	103,000	...	...	.....	.....	Baldwin
Canadian National Rys.	20	4-6-2	23½ x 28	260,000	Yes	Yes	Walschaert	.....	Montreal
	10	4-6-2	24 x 28	275,000	Yes	Yes	Young	.....	Montreal
	25	2-10-2	26x x32	320,000	Yes	Yes	Walschaert	.....	Montreal
	20	0-6-0	21 x 26	154,000	Yes	Yes	Walschaert	.....	Canadian
Canadian Pacific	15	2-8-2	25½ x 32	320,000	Yes	Yes	Walschaert	.....	Montreal
	5	2-10-2	.....	.....	...	...	.....	.....	Company shops
Foundation Co.	2	0-4-0	16 x 24	99,000	...	...	.....	.....	Montreal
	1	2-6-0	16 x 24	85,000	...	...	.....	.....	Montreal
Grand Trunk	10	0-8-0	26 x 30	242,750	Yes	Yes	Young	.....	Canadian
	10	0-6-0	22 x 26	.....	...	...	.....	.....	Company shops
Grand Trunk Pacific	12	4-6-2	23½ x 28	260,000	Yes	Yes	Young	.....	Montreal
	10	0-6-0	21 x 26	154,400	Yes	Yes	Walschaert	.....	Canadian
	15	2-8-2	27 x 30	277,500	Yes	Yes	Walschaert	.....	Canadian
Hydro Elec. Power Comm.	2	0-4-0	16 x 24	99,000	...	...	.....	.....	American
	2	0-4-0	16 x 24	99,000	...	...	.....	.....	American
Hydro-Electric Power Comm.	5	0-4-0	17 x 24	106,000	...	...	.....	.....	Baldwin
Pacific Great Eastern	3	2-8-2	22 x 28	210,100	Yes	Yes	Walschaert	.....	Canadian
Reid-Newfoundland Co.	6	4-6-2	17 x 24	113,000	Yes	Yes	.....	.....	Baldwin
Roberval-Saguenay	1	4-6-0	19 x 24	134,000	...	...	.....	.....	Canadian
	1	4-6-0	19 x 24	134,000	...	...	.....	.....	Canadian
Temiskaming & Northern Ontario	2	0-8-0	23 x 28	203,000	Yes	Yes	Young	.....	Montreal
	4	2-8-2	25 x 30	258,000	Yes	Yes	Young	.....	Canadian
	4	4-6-2	23 x 28	252,500	Yes	Yes	Young	.....	Canadian

Export

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Amer. R. R. of Porto Rico	2	2-8-0	14 x 20	85,000	...	...	.....	.....	American
Armstrong-Fajordo Sugar So (P. R.)	1	2-8-0	15 x 19	74,000	...	...	.....	.....	American
Banshu Ry. (Japan)	1	2-6-2	.....	.....	...	...	.....	.....	Baldwin
Baturite Ry. (Brazil)	1	2-8-0	15 x 18	.....	...	...	.....	.....	American
	2	4-6-0	.....	.....	...	...	.....	.....	American
Blanco Brothers (Cuba)	1	0-4-0-T	14 x 22	29,000	...	...	.....	.....	American
Boos & Co (Trinidad)	3	0-4-2-T	11 x 16	42,000	...	...	.....	.....	American
Burma Corpn., Ltd.	3	Electric	500 v.d.c	78,000	...	...	.....	.....	Gen. Electric
Camoa Quarry Co. (Cuba)	1	.....	.....	.....	...	...	.....	.....	Vulcan
	1	2-8-0	.....	.....	...	...	.....	.....	Vulcan
Canton Hankow (China)	8	2-8-0	.....	.....	...	...	.....	.....	Baldwin
	4	4-6-0	.....	.....	...	...	.....	.....	Baldwin
Carlos-Alfred-Isabela de Sagua (Cuba)	1	2-6-2	17 x 24	117,000	...	...	.....	.....	American
Central Adela (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Algodones (Cuba)	1	2-8-0	18 x 24	124,000	...	...	.....	.....	American
Central Altamira (Cuba)	2	.....	.....	.....	...	...	.....	.....	Baldwin
Central Andreita (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Araujo (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Australia (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Bagnanos (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Caracas (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Cespedes (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Colonos de Nueva Paz (Cuba)	2	0-6-2	18 x 24	114,000	...	...	.....	.....	American
Central Corazon de Jesus (Cuba)	1	2-8-0	18 x 24	124,000	Yes	...	.....	.....	American
Central Cunagua (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Dominicano (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Esperanza (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Estrella (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Galope (Cuba)	2	.....	.....	.....	...	...	.....	.....	Baldwin
Central Jaronu (Cuba)	6	.....	.....	.....	...	...	.....	.....	Baldwin
Central Josefita (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central La Francia (Cuba)	2	.....	.....	.....	...	...	.....	.....	Baldwin
Central Lincoln (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Najasa (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central of Brazil	6	4-6-0	21½ x 26	174,000	Yes	...	.....	.....	American
	6	4-6-0	16 x 20	82,000	Yes	...	.....	.....	American
	18	2-8-0	21½ x 26	170,000	Yes	...	.....	.....	American
	10	2-8-0	17 x 20	93,000	Yes	...	.....	.....	American
Central Oriente (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Pilar (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Portugalete (Cuba)	1	2-8-0	18 x 24	124,000	...	...	.....	.....	American
Central Progreso (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Ramona (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Reforma (Cuba)	1	2-8-0	18 x 24	125,000	...	...	.....	.....	American
	1	2-6-2	14 x 22	93,000	..	...	.....	.....	American
Central Rosalia (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central San Aug. (Cuba)	1	2-8-0	18 x 24	124,000	Yes	...	.....	.....	American
Central San Christobal (Cuba)	3	.....	.....	.....	...	...	.....	.....	Baldwin
Central Santa Amelia (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Cent. St. Dominicas (San Dom.)	3	.....	.....	.....	...	...	.....	.....	Bell
Central Santa Maria (Cuba)	1	4-6-0	18 x 24	120,000	Yes	...	.....	.....	American
Central Santo Tomas (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Central Sofia (Cuba)	1	2-6-0	16 x 24	85,000	...	...	.....	.....	American
Central Zaza (Cuba)	1	2-8-0	.....	.....	...	...	.....	.....	Baldwin
C. de f. de la Prov. de Santa Fe (Arg.)	10	4-6-2	16 x 20	105,000	Yes	...	.....	.....	American
Cia Trans. de Petrolea (Mex.)	1	0-4-0	7 x 12	17,000	...	...	.....	.....	Baldwin
	1	0-4-0	11 x 16	36,000	...	...	.....	.....	Baldwin
Ciego de Avila (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Cia Azacarera Seramaguacan (Cuba)	1	2-6-0	18 x 24	114,000	...	...	.....	.....	American
Cordoba Central (Argentina)	15	2-8-2	21½ x 24	163,000	Yes	...	.....	.....	American
Cuban American Sugar Co.	1	.....	.....	.....	...	...	.....	.....	Baldwin
Cuba Cane Sugar Corp.	9	2-8-0	.....	.....	...	...	.....	.....	Baldwin
	2	.....	.....	.....	...	...	.....	.....	Baldwin
Cane Sugar Corp.	3	2-8-0	19 x 26	135,000	...	...	.....	.....	American
Cuba R. R.	10	4-6-0	21 x 26	174,000	Yes	Yes	Walschaert	.....	American
	2	2-8-0	19 x 26	137,000	Yes	Yes	Walschaert	.....	American
Cuban Central Railway	10	2-8-0	18 x 24	126,000	Yes	...	.....	.....	American
Cuba Sugar Mills Corp.	2	.....	.....	.....	...	...	.....	.....	Baldwin
E. d. F. C. Barboza (Brazil)	1	2-8-2	21 x 24	161,000	Yes	...	.....	.....	American
	4	4-6-2	19 x 26	131,000	Yes	...	.....	.....	American
E. d. F. Paracatu (Brazil)	1	4-6-0	13 x 18	60,000	...	...	.....	.....	American
E. d. F. Menas St. Jeronymo (Brazil)	1	2-6-2-T	11 x 16	52,000	...	...	.....	.....	American
Egyptian State Rys.	30	2-6-0	.....	.....	...	...	.....	.....	Baldwin
Ferrer Jose (Cuba)	1	2-8-0	14 x 18	54,000	...	...	.....	.....	American
Forestry Bureau (Japan)	4	0-4-2	.....	.....	...	...	.....	.....	Baldwin
Fuji Minobu (Japan)	2	4-6-0	.....	.....	...	...	.....	.....	Baldwin
	1	2-6-2	.....	.....	...	...	.....	.....	Baldwin
Havana Central	28	2-8-0	20 x 26	163,000	Yes	...	.....	.....	American
Haytian Amer. Corp.	1	2-6-0	15 x 20	76,000	...	...	.....	.....	American
	1	0-4-0	11 x 16	35,000	...	...	.....	.....	American
Hudson, Robert (Africa)	2	2-8-0	15-23½ x 20	87,000	...	...	.....	.....	American
Humberto Saboia (Brazil)	2	4-6-0	15 x 20	74,000	...	...	.....	.....	American
	1	2-8-0	16 x 20	81,000	...	...	.....	.....	American
Imperial Japanese Navy	2	0-4-0	13 x 20	65,000	...	...	.....	.....	American
Imperial Taiwan Ry. (Formosa)	7	2-8-0	20 x 24	131,000	Yes	...	.....	.....	American
Insp. Fed. des Obres Contra as Siccas(Brazil)	6	2-8-0	16 x 20	80,000	...	...	.....	.....	American
	8	4-6-0	15 x 20	74,000	...	...	.....	.....	American
	6	0-4-0-T	9 x 14	29,000	...	...	.....	.....	American
Internat'l Ry. Supply Co. (for Porto Rico)	2	Switch	.....	.....	...	...	.....	.....	Baldwin
Jamaica Government	3	4-8-0	19 x 26	137,500	...	Yes	.....	.....	Canadian
	7	4-8-0	19 x 26	148,300	Yes	Yes	.....	.....	Canadian
Joso Ry. (Japan)	3	2-6-2	.....	.....	...	...	.....	.....	Baldwin
La Vega Sugar Co. (Cuba)	1	2-8-0	18 x 24	124,000	...	...	.....	.....	American
Madrid, Zargossa & Alicante (Spain)	15	4-6-2	23 x 26	187,000	Yes	...	.....	.....	American
Manila	10	4-8-2	20 x 28	185,000	Yes	...	.....	.....	American
	10	2-10-2	20 x 28	190,000	Yes	...	.....	.....	American
Manuel Gomez Mena (Cuba)	1	2-8-0	19 x 26	137,000	Yes	...	.....	.....	American
Marcelino Garcia (Cuba)	1	2-8-0	18 x 24	126,000	Yes	...	.....	.....	American
Mitsui & Co. (Far East)	3	2-8-0	.....	.....	...	...	.....	.....	American
	4	4-6-2	.....	.....	...	...	.....	.....	American
	4	.....	.....	.....	...	...	.....	.....	American
Mogyana (Brazil)	2	4-6-2	17½ x 20	118,000	...	...	.....	.....	American
Mysore Ry. (Ind.)	5	2-6-4	.....	.....	...	...	.....	.....	Baldwin
National Rys. of Mexico	5	.....	.....	.....	...	...	.....	.....	Baldwin
Noroeste de Brazil	20	.....	.....	.....	...	...	.....	.....	Baldwin
Pampanga Sugar Develop. Co. (P. I.)	11	0-4-0	.....	.....	...	...	.....	.....	Bell
Paris-Orleans (France)	50	4-6-2	24½ x 25½	200,000	Yes	...	.....	.....	American
Paulista Ry. (Brazil)	6	.....	.....	.....	...	...	.....	.....	Baldwin
Paulista Ry. (Brazil)	2	Electric	.....	188,000	...	...	.....	.....	Bald. - West'house
	2	Electric	.....	242,000	...	...	.....	.....	Bald. - West'house
	4	Electric	3,000 v.d.c.	240,000	...	...	.....	.....	General Electric
	8	Electric	3,000 v.d.c.	200,000	...	...	.....	.....	General Electric

Export

Purchaser	No.	Type	Cylinders	Weight	Superheater	Brick arch	Valve gear	Mechanical stoker	Builder
Perin & Marshall (for India)	2	Switch	.....	.....	...	...	.....	.....	Baldwin
Quelimane Ry. (South Africa)	1	2-6-0	13 x 18	53,000	...	...	.....	.....	American
Rhodesian	12	4-8-2	22 x 24	170,000	Yes	...	.....	.....	American
Rio Grande do Sul (Brazil)	20	2-8-2	16 x 22	110,000	Yes	...	.....	.....	American
Roumanian Gov't Rys.	25	2-8-0	21 x 28	167,000	Yes	...	.....	.....	Baldwin
	25	2-8-0	21 x 28	167,000	Yes	...	.....	.....	American
Sabana R. R. (Columbia)	2	.....	.....	.....	...	...	.....	.....	Baldwin
Shantung Railway (China)	3	2-8-0	21 x 26	160,000	Yes	...	.....	.....	American
	3	4-6-2	20 x 26	180,000	Yes	...	.....	.....	American
	1	4-6-2	20 x 26	180,000	Yes	...	.....	.....	American
Sorocabana (Brazil)	4	4-6-2	18 x 20	120,000	Yes	...	.....	.....	American
So. Manchurian	12	4-6-2	.....	.....	...	...	.....	.....	Baldwin
Taiwan Denryoku Kaisha (China)	4	0-8-0	11 x 16	50,000	...	...	.....	.....	American
Taiwan Seito Formosa Co.	2	0-6-0	.....	.....	...	...	.....	.....	Baldwin
Takata & Co. (Japan)	5	Electric	.....	42,000	...	...	.....	.....	Bald. - West'house
Tientsin-Pukow (China)	20	2-8-2	20 x 28	194,000	Yes	...	.....	.....	American
	12	4-6-2	22 x 26	215,000	Yes	...	.....	.....	American
Tramway Cantareira (Brazil)	2	2-6-0	13 x 18	57,000	...	...	.....	.....	American
Unidad Fruit Co. (Cuba)	1	.....	.....	.....	...	...	.....	.....	Baldwin
Union Miniere du H. Kantanga (Congo)	4	2-6-2	15 x 20	101,000	...	...	.....	.....	American
United Fruit Co.	5	2-8-0	.....	.....	...	...	.....	.....	Baldwin
	1	0-8-0	.....	.....	...	...	.....	.....	Bell
	3	.....	.....	.....	...	...	.....	.....	Porter
	3	2-6-0	12 x 16	.....	...	...	.....	.....	Porter
	14	0-4-0	.....	.....	...	...	.....	.....	Bell
	2	0-4-4	.....	.....	...	...	.....	.....	Porter
	2	2-8-0	.....	.....	...	...	.....	.....	Baldwin
United Rys. of Havana	28	2-8-0	.....	.....	...	...	.....	.....	American
	10	4-6-2	.....	.....	...	...	.....	.....	Baldwin
	8	Switch	.....	.....	...	...	.....	.....	Baldwin
U. S. War Dept (Panama)	2	0-4-2-T	16 x 24	114,000	...	...	.....	.....	American
Vanadium Corp. of America (for Peru)	2	.....	.....	.....	...	...	.....	.....	Davenport
West India Sugar & Finance Corp. (Cuba)	1	2-6-0	15 x 20	76,000	...	...	.....	.....	American
Zayas-Abreu Com. Co.	2	2-8-0	18 x 24	125,000	Yes	...	.....	.....	American

Increase in Passenger Car Orders Continues

Orders Given Late in 1920 Promise Upward Movement of Production During This Year

THE TOTALS FOR ORDERS of passenger cars during the past year give proof of the upward trend which was noted in the statistical report on passenger car orders last year (*Railway Age*, January 2, 1920, page 133). A total of 1,115 cars was ordered by Class I roads during the year and 666 by other railroads and private car companies in the United States, including the Pullman Company. These

TABLE I. THE PASSENGER CAR ORDERS OF 1920

For Class I Railroads	1,115
Other Domestic (including Pullman Co.)	666
Total Domestic	1,781
For Service in Canada	275
For Export to other Countries	38
Grand Total	2,094

figures added together give 1,781 as a total for the year's domestic orders, a figure which compares quite favorably with the orders in 1917 and 1918—as well as 1919. It will be noted that the statistics given this year separate the orders by Class I roads from the other domestic orders. By following this plan of separation hereafter a more accurate

TABLE II. ORDERS FOR PASSENGER CARS SINCE 1901

Domestic orders only

	Passenger cars		Passenger cars
1901	2,879	1909	4,514
1902	3,459	1910	3,881
1903	2,310	1911	2,623
1904	2,213	1912	3,642
1905	3,289	1913	3,179
1906	3,402	1914	2,002
1907	1,791	1915	3,101
1908	1,319		

Domestic and Foreign

Year	Domestic	Foreign	Total
1916	2,544	109	2,653
1917	1,124	43	1,167
1918	131	26	157
1919	639	143	782

idea will be given of just what is being done by the more important railroads toward making up deficiencies accumulated for some years.

Canadian orders for the year were 275—72 less than the 1919 figure. Export orders have dropped even more sharply. Export orders for 1920 were only 38, which is a rather poor showing in comparison with the total of 143 in 1919. Passenger car building has, however, been at a minimum the world over for some years, although eventually it must increase greatly. The grand total of passenger car orders for domestic service and export in this country and in Canada was 2,094—1,312 more than the 1919 figure, an increase brought about entirely by greater orders from the roads and other buyers in the United States.

The production of passenger cars during 1920 in the

TABLE III. PASSENGER CARS BUILT

	United States	Canada*	Total
Domestic	1,272	....	....
Foreign	168	....	....
	1,440	....	....

*Complete details Canadian production not received.

Comparison with Previous Years

Year	Passenger Domestic	Passenger Foreign	Passenger Total
1899	1,201	104	1,305
1900	1,515	121	1,636
1901	1,949	106	2,055
1902	From 1902 to 1907 passenger		1,948
1903	car figures in these two		2,007
1904	columns included in corre-		2,144
1905*	sponding frt. car columns.		2,551
1906*	.....	...	3,167
1907*	.....	...	5,457
1908*	1,645	71	1,716
1909*	2,698	151	2,849
1910*	4,136	276	4,412
1911*	3,938	308	4,246
1912†	2,822	238	3,060

*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

	Domestic	Foreign	Total	Domestic	Foreign	Total	Total
	United States			Canadian			Grand
1913	2,559	220	2,779	517	.....	517	3,296
1914	3,310	56	3,366	325	.....	325	3,691
1915	1,852	14	1,866	83	.....	83	1,949
1916	1,732	70	1,802	37	.....	37	1,839
1917	1,924	31	1,955	45	.....	45	2,000
1918	1,480	92	1,572	1	.....	1	1,503
1919	306	85	391	160	.....	160	551

United States for domestic use was 1,272 (including cars for Pullman Company service) and for export 168. These figures show decided improvement over the similar figures, 306 and 85 respectively, for 1919. The cars built are described as: all steel, 1,240; steel underframe only, 171; wood, 21, and not specified, 8. This upward trend of production was predicted in the statistical review of the passenger car situation last year, in view of the increase in orders the latter part of 1919. Much the same situation obtains at the beginning of 1921. Most of the larger orders for passenger equipment were placed relatively early in 1920.

The car building companies started the year with orders for domestic service on hand and undelivered amounting to 407. The traffic congestion, the difficulty of securing raw material and related conditions prevented them from getting production under way with any great degree of speed. The orders on hand at the end of November had reached a total of 925.

Passenger Orders in 1920

Class I Roads

Purchaser	No.	Class	Construction	Weight	Wheels per truck	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Alabama & Vicksburg	3	Coach	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.
	3	Pass. & bagg.	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.
	3	Baggage	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.
Atlanta & West Point	3	Baggage	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.
	4	Coach	Steel	127,000	6	Electric	Safety	Edison	Am. Car & Fdy.
Atlantic Coast Line	25	Coach	Steel	138,300	6	Electric	Stone-Franklin	Edison	Pullman
Baltimore & Ohio	43	Express	St. und'frame	42,500	4	.....	.....	.....	Mt. Vernon
Bangor & Aroostook	1	Baggage	Steel	78,000	4	Electric	Safety	Edison	Osgood-Bradley
Boston & Albany	15	Coach	Steel	.....	6	Electric	.....	.....	Standard Steel
	7	Baggage	Steel	.....	4	Electric	.....	.....	Am. Car & Fdy.
Central of Georgia	9	Coach	Steel	136,000	6	Electric	Safety	Edison	Pullman
	4	Express	Steel	128,900	6	Electric	Safety	Edison	Pullman
	4	Sleeper	Steel	148,000	6	Electric	Safety	Edison	Pullman
Chicago & North Western	25	Coach	Steel	105,200	4	Gas	.....	.....	Am. Car & Fdy.
	2	Postal	Steel	128,000	6	Gas	.....	.....	Am. Car & Fdy.
	9	Coach	Steel	105,000	4	Gas	.....	.....	Am. Car & Fdy.
	23	Baggage	Steel	121,300	6	Gas	.....	.....	Am. Car & Fdy.
	3	Bag. & mail	Steel	133,600	6	Gas	.....	.....	Am. Car & Fdy.
Chicago, Rock Island & Pacific	30	Coach	Steel	.....	6	Electric	USL	USL	Pullman
	5	Chair	Steel	.....	6	Electric	USL	USL	Pullman
Clev., Cin., Chic. & St. Louis	20	Coach	Steel	.....	6	Electric	.....	.....	Am. Car & Fdy.
	25	Baggage	Steel	.....	4	Electric	.....	.....	Am. Car & Fdy.
	8	Pass. & bagg.	Steel	.....	6	Electric	.....	.....	Pressed Steel
	2	Dining	Steel	.....	6	Electric	.....	.....	Company Shops
Delaware, Lackawanna & West.	30	Coach	Steel	108,000	4	Electric	Gould	Gould	Pullman
	5	Pass. & bagg.	Steel	110,000	4	Electric	Gould	Gould	Pullman
	5	Express	Steel	104,000	4	Electric	Gould	Edison	Pullman
	10	Milk	St. und'frame	65,500	4	.....	.....	.....	Am. Car & Fdy.
Erie	42	Coach	Steel	93,000	4	Electric	Safety	Edison	Standard Steel
	6	Pass. & bagg.	Steel	93,000	4	Electric	Safety	Edison	Standard Steel
Florida East Coast	6	Baggage	Steel	.....	6	Electric	Safety	Edison	Pullman
	2	Bagg. & mail	Steel	.....	6	Electric	Safety	Edison	Pullman
Georgia	5	Coach	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.
Grand Trunk (Western)	10	Horse	Steel frame	125,000	6	Electric	Safety	Safety	Osgood-Bradley
Gulf Coast Lines	10	Coach	Steel	.....	4	Electric	Safety	Edison	Am. Car & Fdy.
	5	Baggage	Steel	.....	4	Electric	Safety	Edison	Am. Car & Fdy.
Illinois Central	12	Compt. coach	Steel	.....	6	Electric	Safety	Edison	Pullman
	18	Baggage	Steel	.....	6	Electric	Safety	Edison	Pullman
	5	Dining	Steel	.....	6	Electric	Safety	Edison	Pullman
	20	Suburban	Steel	.....	4	Electric	Safety	Edison	Pullman
Long Island	50	Trailer	Steel	69,900	4	Electric	.....	.....	Am. Car & Fdy.
	20	Mot. coach	Steel	107,200	4	Electric	.....	.....	Am. Car & Fdy.
	30	Coach	Steel	.....	4	Electric	Gould	.....	Standard Steel
Los Angeles & Salt Lake	8	Baggage	Steel	.....	6	Electric	.....	Edison	Pullman
	5	Chair	Steel	.....	6	Electric	Safety	.....	Pullman
	5	Dining	Steel	136,200	6	Electric	.....	.....	Pullman
Louisiana & Arkansas	2	Coach	Steel	135,000	6	Gas	.....	.....	Am. Car & Fdy.
Louisville & Nashville	8	Baggage	Steel	135,000	6	Electric	Safety	Safety	Am. Car & Fdy.
	3	Postal	Steel	128,000	6	Electric	Safety	Safety	Am. Car & Fdy.
	10	Coach	Steel	138,000	6	Electric	Safety	Safety	Am. Car & Fdy.
	15	Coach	Steel	138,000	6	Electric	Safety	Safety	Am. Car & Fdy.
	5	Coach	Steel	138,000	6	Electric	Safety	Safety	Am. Car & Fdy.
	4	Postal	Steel	128,000	6	Electric	Safety	Safety	Am. Car & Fdy.
	4	Baggage	Steel	130,000	6	Electric	Safety	Safety	Am. Car & Fdy.
	7	Dining	Steel	160,000	6	Electric	Safety	Safety	Am. Car & Fdy.
Maine Central	7	Baggage	Steel	.....	6	Electric	Safety	Edison	Osgood-Bradley
	2	Bagg. & mail	Steel	78,000	4	Electric	Safety	Edison	Osgood-Bradley
Minn., St. Paul & Sault Ste. M.	6	Baggage	Steel	122,000	6	Electric	Gould	Exide	Am. Car & Fdy.
	6	Sleeping	Steel	144,000	6	Electric	Gould	Exide	Am. Car & Fdy.
	1	Business	Steel	.....	6	Electric	Gould	Exide	Am. Car & Fdy.
	3	Dining	Steel	.....	6	Electric	Gould	Exide	Am. Car & Fdy.
Michigan Central	15	Coach	Steel	.....	6	Electric	.....	.....	Standard Steel
	8	Baggage	Steel	.....	4	Electric	.....	.....	Am. Car & Fdy.
	3	Pass. & bagg.	Steel	.....	6	Electric	.....	.....	Pressed Steel
	2	Dining	Steel	.....	6	Electric	.....	.....	Company shops
	8	Bagg. & mail	Steel	.....	4	Electric	.....	.....	Company shops
	2	Postal	Steel	.....	4	Electric	.....	.....	Company shops
Missouri, Kansas & Texas	4	Dining	Steel	.....	6	Electric	.....	.....	Am. Car & Fdy.
Missouri Pacific Ry	25	Baggage	Steel	.....	6	Electric	Stone	Edison	Am. Car & Fdy.
	10	Coach	Steel	.....	6	Electric	Stone	Edison	Am. Car & Fdy.
New York Central	50	Coach	Steel	.....	6	Electric	.....	.....	Standard Steel
	35	Baggage	Steel	.....	4	Electric	.....	.....	Am. Car & Fdy.
	30	Milk	St. und'frame	.....	4	Electric	.....	.....	Merchants D'patch
	15	Mot. coach	Steel	.....	4	Electric	.....	.....	Standard Steel
	8	Dining	Steel	.....	6	Electric	.....	.....	Company shops
	10	Baggage	Steel	.....	4	Electric	.....	.....	Company shops
Pere Marquette	12	Baggage	Steel	110,000	4	Electric	Safety	Willard	Standard Steel
	12	Coach	Steel	145,000	6	Electric	Safety	Willard	Standard Steel
Pittsburgh & Lake Erie	5	Coach	Steel	.....	6	Electric	.....	.....	Standard Steel
	5	Baggage	Steel	.....	4	Electric	.....	.....	Am. Car & Fdy.
	1	Pass. & bagg.	Steel	.....	6	Electric	.....	.....	Pressed Steel
Pittsburgh & Shawmut	2	Pass. & bagg.	Steel	130,000	6	Electric	Gould	USL	Am. Car & Fdy.
	2	Coach	Steel	130,000	6	Electric	Gould	USL	Am. Car & Fdy.
Southern Pacific	28	Coach	Steel	.....	4	Electric	.....	.....	Pullman
	22	Baggage	Steel	.....	4	Gas	.....	.....	Pullman
	3	Baggage	Steel	.....	6	Gas	.....	.....	Pullman
	3	Bagg. & mail	Steel	.....	4	Gas	.....	.....	Pullman
	2	Bagg. & mail	Steel	.....	6	Gas	.....	.....	Pullman
	26	Mot. coach	Steel	.....	..	.....	.....	.....	Pullman
	16	Trailer	.....	.....	..	.....	.....	.....	Pullman

Purchaser	No.	Class	Construction	Weight	Wheels per truck	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Toledo & Ohio Central	1	Bagg. & mail	Steel	.....	6	Electric	.....	.....	Company shops
Union Pacific	40	Chair	Steel	134,000	6	Gas & elec.	.....	.....	Pullman
	25	Baggage	Steel	110,500	6	Electric	.....	.....	Pullman
	2	Dining	Steel	160,000	6	Electric	USL	Edison	Pullman
Virginian	1	Club	Steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	4	Bagg. & mail	Steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	10	Coach	Steel	.....	6	Electric	Stone-Franklin	Edison	Pullman

*Not included in totals.

Other Domestic Purchasers, Including Pullman Company

Purchaser	No.	Class	Construction	Weight	Wheels per truck	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Alger Sullivan Lbr. Co.	1	Coach	Wood	.....	..	Oil	.....	.....	Am. Car & Fdy.
Arms Palace Horse Car	25	Horse	St. und'frame	144,000	4	.....	.....	.....	Pullman
Boston Elevated	65*	Bodies for motor passenger cars.			..	.....	.....	.....	Pressed Steel
Escambia	1	Coach	Wood	80,000	4	Oil	.....	.....	Am. Car & Fdy.
Ford, Henry	1	Private	Steel	.....	6	Electric	.....	.....	Pullman
Hassler, Inc., R. H.	4	Express	.....	.....	..	.....	.....	.....	Mt. Vernon
Hudson & Manhattan	25	Mot. coach	Steel	.....	4	Electric	.....	.....	Am. Car & Fdy.
Interstate R. R.	1	Coach	Wood	100,000	..	Electric	Gould	Gould	Am. Car & Fdy.
	1	Bagg. & mail	Wood	100,000	..	Oil	.....	.....	Am. Car & Fdy.
New York Consolidated	100*	Mot. coach	Steel	73,000	4	Electric	.....	.....	Pressed Steel
Pullman Co.	60	Sleeping	Steel	.....	6	Electric	.....	.....	Company shops
San Francisco-Oakland Term.	18*	Coach	Steel	45,000	4	Electric	.....	.....	Company shops
	25*	Coach	Steel	17,000	4	Electric	.....	.....	Am. Car & Fdy.
	10*	Coach	Steel frame	30,000	4	Electric	.....	.....	Company shops
Western Ry. of Alabama	4	Coach	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.
	3	Baggage	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.

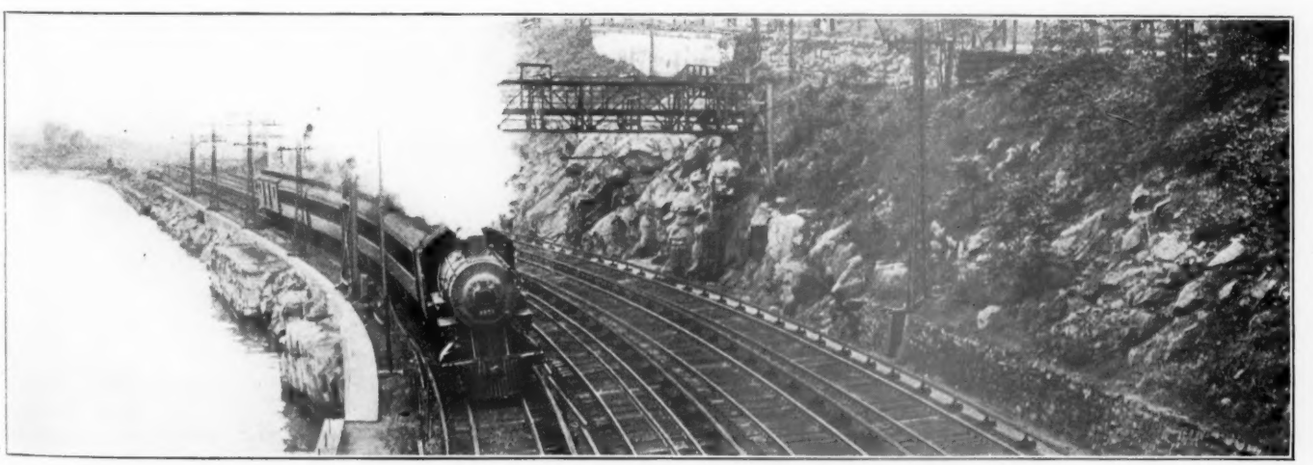
*Not included in totals.

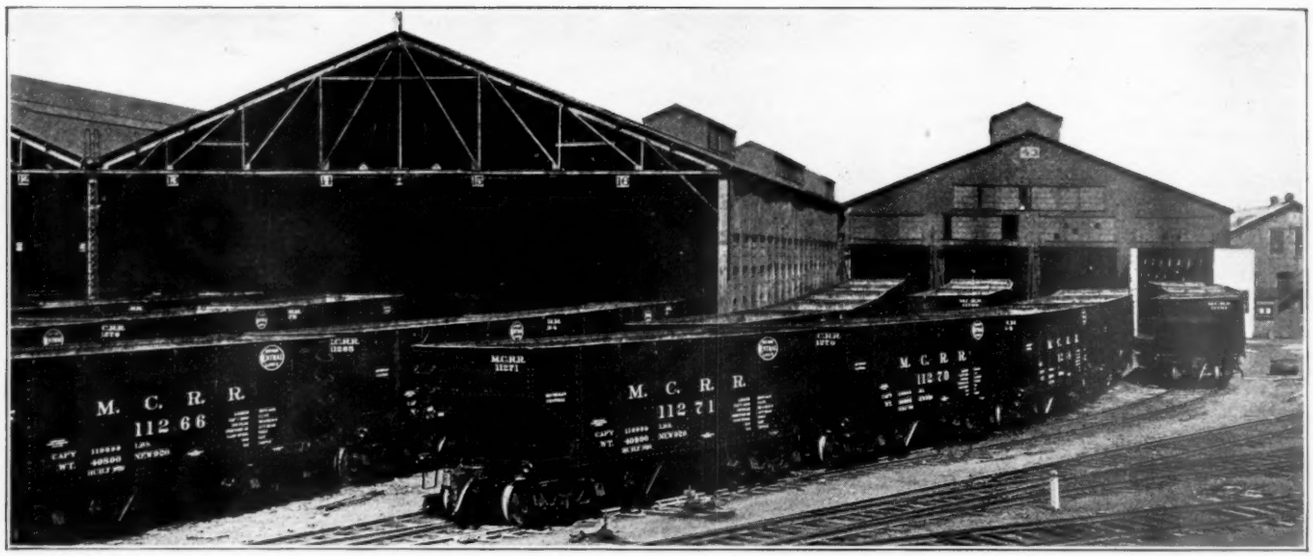
Railways and Other Companies in Canada

Purchaser	No.	Class	Construction	Weight	Wheels per truck	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Canadian National	18	Sleeper	Steel	164,000	6	Electric	Stone-Franklin	Tonum	Can. Car & Fdy.
	12	Dining	Steel	168,000	6	Electric	Stone Franklin	Tonum	Can. Car & Fdy.
	20	Baggage	Steel	128,000	6	Electric	Stone-Franklin	Tonum	Can. Car & Fdy.
	20	Exp. refr.	Steel	.....	4	.....	.....	.....	Nat'l Steel
Grand Trunk	50	Baggage	Steel frame	98,000	4	Electric	Safety	Willard	Can. Car & Fdy.
	15	Exp. refr.	St. und'frame	.....	4				Can. Car & Fdy.
Canadian Pacific	56	Sleeping	Steel frame	168,000	6	Electric	Safety	Stone-Franklin	Can. Car & Fdy.
	13	Sleeping	Steel frame	170,000	6	Electric	Safety	Willard	Can. Car & Fdy.
	12	Dining	Steel frame	180,000	6	Electric	Safety	Stone-Franklin	Can. Car & Fdy.
	24	Baggage	Steel frame	150,000	6	Electric	Safety	Stone-Franklin	Can. Car & Fdy.
Grank Trunk Pacific	30	Exp. refr.	Steel	.....	4	.....	.....	.....	Nat'l Steel
Pacific Great Eastern	3	1st class	Steel frame	90,000	4	Oil	.....	.....	Pullman
Roberval-Saguenay	1	Coach	Steel	.....	4	Oil	.....	.....	Company shops
	1	Baggage	Steel	.....	4	Oil	.....	.....	Company shops

Export

Purchaser	No.	Class	Construction	Weight	Wheels per truck	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Havana Central	8	Baggage	St. und'frame	85,000	4	Electric	.....	.....	Osgood-Bradley
	10	Bagg. & mail	St. und'frame	86,000	4	Electric	.....	.....	Osgood-Bradley
Panama	1	Observation	St. und'frame	81,000	4	Oil	.....	.....	Company shops
	2	Parlor	St. und'frame	81,000	4	Oil	.....	.....	Company shops
Various foreign purchasers	17	Orders not reported in detail		.....	..	.....	.....	.....	Am. Car & Fdy.





At the McKees Rocks Plant of the Fressed Steel Car Company

Purchases of Freight Cars Increase in 1920

Orders Placed After Return to Private Operation Make Totals Almost Four Times Those for 1919

IN THE NUMBER of freight cars ordered during 1920 there has been, as was the case with the locomotives, a remarkable improvement over the 1919 showing. The orders by Class I roads were 51,250 cars, by other domestic roads 1,044 and by private car lines and industrials 31,913—making a total of 84,207 cars ordered in the United States for domestic service. To this figure are added the total orders of 12,406 placed by Canadian roads and industries and 9,056 ordered by foreign buyers, which brings the total orders received in this country and Canada during the year up to 105,669. In 1919 the total domestic orders were 22,062—scarcely one-fourth the 1920 total. Canadian orders of 3,837 for 1919 are scarcely a third of the purchases for 1920 and the export orders of 3,994 are less than one-half the total purchases for export during 1920.

As was pointed out in the review of the locomotive orders for this year, the showing for freight car orders is not entirely unsatisfactory in view of the uncertain conditions which prevailed throughout the greater part of the period, even the close of which brought no conclusive proof that the rate structure provided by the Interstate Commerce Commission was going to provide adequate returns to the carriers. The fact remains, however, that the acquisitions of freight cars in 1920 were far from sufficient to make up the deficiencies in orders which have accumulated during the past eight years. The showing of freight car orders for 1920 does not even compare favorably with the totals for any recent year with the exception of 1914 and 1917. The domestic

TABLE I—THE FREIGHT CAR ORDERS OF 1920

For Class I railroads	51,250
For other American railroads	1,044
For private car lines and industrials	31,913
Total domestic	84,207
For service in Canada	12,406
For export to other countries	9,056
Grand total	105,669

TABLE II—ORDERS FOR FREIGHT CARS SINCE 1901

Domestic orders

	Freight cars		Freight cars
1901	193,439	1908	62,669
1902	195,248	1909	189,360
1903	108,936	1910	141,024
1904	136,561	1911	133,117
1905	341,315	1912	234,758
1906	310,315	1913	146,732
1907	151,711	1914	80,264

Domestic and foreign

Year	Domestic	Foreign	Total
1915	109,792	18,222	128,014
1916	170,054	35,314	205,368
1917	79,367	53,191	132,558
1918	123,770	53,547	177,317
1919	25,899	3,994	29,893

TABLE III—FREIGHT CARS BUILT

	United States	Canada*	Total
Domestic	60,955	.....	.....
Foreign	14,480	.....	.....
	75,435	.....	.....

*Complete details of Canadian production not received.

Comparison with Previous Years

Year	Freight Domestic	Freight Foreign	Freight Total
1899	117,982	1,904	119,886
1900	113,070	2,561	115,631
1901	132,591	4,359	136,950
1902	161,747	2,800	162,599
1903	153,195	1,613	152,801
1904	60,955	1,995	60,806
1905*	162,701	5,305	165,155
1906*	236,451	7,219	240,503
1907*	280,216	9,429	284,188
1908*	75,344	1,211	76,555
1909*	91,077	2,493	93,570
1910*	176,374	4,571	180,945
1911*	68,961	3,200	72,161
1912†	148,357	4,072	152,429

*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand
	Domestic	Foreign	Total	Domestic	Foreign	Total	Total
1913	176,049	9,618	185,667	22,017	.....	22,017	207,684
1914	97,626	462	98,088	6,453	.....	6,453	104,451
1915	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916	111,516	17,905	129,421	.....	.....	5,580	135,001
1917	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918	67,063	40,981	108,044	14,704	1,960	16,664	124,708
1919	94,981	61,783	156,764	6,391	30	6,421	163,185

orders in 1918 alone were for some 40,000 more than in 1920.

In the review of the statistics of freight car orders in 1919 (*Railway Age*, January 2, 1920, page 128) it was pointed out that by far the greater part of the orders for that year were from private car lines. It is pleasing to note in connection with the 1920 totals, that, although the orders from private car lines are practically twice the 1919 figures, the railway orders are nevertheless much larger than those from the private buyers.

The export orders for 1920 are more than twice the total for 1919, but far below the average for the preceding four years. This falling off may be explained in the same manner as was the decline in locomotive orders from abroad, i. e., the premium on the dollar in foreign countries, the return of foreign manufacturers into active competition and the generally impoverished condition of buyers throughout the world.

Freight car production in the United States during 1920 for domestic service was 60,955 and for export 14,480, making a total of 75,435 cars built in the United States during the year. The totals for 1915 only in recent years are lower than those for the past year. This decline in production is but the natural outcome of the few orders placed during 1919 and was predicted in the statistical review of freight car orders for 1919. The heavier orders during 1918 gave 1919 an excellent showing from the standpoint of production in spite of the fact that the orders during 1919 were much lower than usual.

The production for export in 1920—14,480—represents a decline of more than 75 per cent over the 1919 figures. It was pointed out in the statistical review for 1919 that the production for that year for export bore a large ratio to the total production and the domestic orders a small ratio to the total. This condition has not obtained during the year just past and indeed the small total for export may well occasion some concern. It is true that foreign buyers are not acquiring new equipment in anything like the quantities which they actually require, but it is also evident that manufacturers abroad are once more directing their efforts toward regaining the markets lost to American concerns during the war and that the premium on the dollar gives them an opportunity in many cases to underbid American manufacturers.

In addition to the number of cars built and ordered during the year the *Railway Age* also asked the manufacturers for details regarding the type of cars built. The following details concerning the construction of cars built in the United States may be of interest. All-steel, 34,140; steel frames only, 6,537; steel underframes only, 22,862; steel center sills only, 635; all-wood, 2,451; not specified, 8,810.

If the orders for the preceding year are any measure of production for the following year, and it would seem that they are, the production in 1921 should greatly exceed the 1920 total. Orders in 1918 were comparatively high and production in 1919 was high. Few orders in 1919 resulted in low production totals for the past year. In like manner, then, orders having increased greatly in 1920, production in 1921 should show considerable advances. It is well to point out in this connection that the greater part of the orders for cars in 1920 were placed in the earlier part of the year but that conditions of transportation were such and raw material so difficult to secure that the manufacturing plants are only now getting up to anything like capacity production. The output of the car building companies has averaged only 3,000 cars a month for the greater part of the year. In October and November it reached 6,000.

The list of orders which follows is compiled from information furnished us by railroads, private car lines and car manufacturers. It was checked and amplified by comparison with the items appearing each week in the Equipment and Supplies column of the *Railway Age*. The railways and manufacturers gave us their usual co-operation in supplying us with information concerning orders and production. We are especially indebted to Dr. W. F. M. Goss, president of the Railway Car Manufacturers' Association, for valuable assistance given us in securing reports from the members of that association.

Freight Car Orders in 1920

Class I Roads

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roof	Builder
Ann Arbor	200	Box	160,000	St. und'frame	46,000	Cardwell	Scullin	Hutchins	Haskell & Barker
Atchison, Topeka & Santa Fe	500	Gondola	100,000	Steel frame	46,400	Miner	.....	.....	Am. Car. & Fdy.
	1,250	Refrig.	80,000	St. und'frame	55,500	.....	.....	.....	Am. Car. & Fdy.
	1,250	Refrig.	80,000	St. und'frame	55,500	.....	.....	.....	Haskell & Barker
Atlantic Coast Line	500	Vent. Box	80,000	St. und'frame	47,000	Farlow	Bettendorf	.....	Std. Steel
	400	Hopper	100,000	Steel	43,500	Farlow	Bettendorf	.....	Std. Steel
Baltimore & Ohio	1,415	Hopper	100,000	Steel	39,000	Farlow	Arch bar	.....	Pressed Steel
	947	Box	80,000	St. und'frame	43,500	Farlow	Arch bar	Murphy	Mt. Vernon
	500	Refrig.	70,000	St. und'frame	55,000	Farlow	Arch bar	Murphy	Am. Car. & Fdy.
Boston & Maine	50	Caboose	.....	St. und'frame	42,000	Spring	.....	.....	Laconia
Carolina, Clinchfield & Ohio	10	Caboose	.....	Steel frame	35,000	Miner	Arch bar	.....	Std. Steel
Chesapeake & Ohio	1,000	Hop. bodies	115,000	Steel	.....	.....	.....	.....	Pressed Steel
	500	Gondola	200,000	Steel	66,000	Miner	Lewis	.....	Pressed Steel
	500	Gondola	200,000	Steel	66,000	Miner	Lewis	.....	Std. Steel
Chicago & Alton	500	Gondola	80,000	Composite	42,000	Cardwell	Arch bar	.....	Gen. American
	344	Gondola	80,000	St. ctr. sills.	36,000	Cardwell	Arch bar	.....	Gen. American
Chicago & North Western	500	Ore	100,000	Steel	34,400	Cardwell	Cast steel	.....	Pullman
	250	Stock	80,000	St. und'frame	39,800	Cardwell	Cast steel	.....	Gen. American
	250	Stock	80,000	St. und'frame	37,700	Cardwell	Cast steel	.....	Gen. American
	50	Caboose	.....	St. und'frame	38,000	Cardwell	Cast steel	.....	Am. Car & Fdy.
	250	Refrig.	80,000	St. und'frame	57,500	Cardwell	Cast steel	.....	Am. Car & Fdy.
Chicago, Burlington & Quincy	500	Stock	60,000	St. ctr. sills	36,000	Farlow	Arch bar	.....	West. Steel
Chicago Great Western	197	Hop. bodies	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Chicago Junction	1	Box	60,000	Steel	36,200	Cardwell	Arch bar	.....	Company shops
	1	Box	60,000	Wood	35,400	Cardwell	Arch bar	.....	Company shops
Chicago, Milwaukee & St. Paul	2,000	Box	100,000	St. und'frame	46,100	Cardwell	Metal	Murphy	Bettendorf
	2,000	Box	100,000	St. und'frame	46,200	Sessions	Metal	Hutchins	Am. Car & Fdy.
Chicago, Rock Island & Pacific	50	Caboose	60,000	St. und'frame	.....	Bradford	Bettendorf	.....	Std. Steel
Chic., St. Paul, Minn. & Omaha	10*	Steel underframes for caboose cars			.....	.....	.....	.....	Bettendorf
	125	Stock	60,000	St. und'frame	37,400	Miner	Bettendorf	.....	Gen. American
Cleve., Cin., Chic. & St. Louis	500	Box	100,000	Steel	47,300	Friction	Cast steel	Steel	Std. Steel
	500	Auto	100,000	Steel	47,800	Friction	Cast steel	.....	Haskell & Barker
	250	Hopper	110,000	Steel	41,200	Friction	Cast steel	.....	Std. Steel
	1,750	Hopper	110,000	Steel	41,200	Friction	Cast steel	.....	Am. Car & Fdy.
	100	Stock	80,000	St. und'frame	39,500	Spring	Cast steel	.....	Haskell & Barker
	20	Caboose	.....	St. und'frame	.....	Spring	Cast steel	.....	Company shops
Delaware & Hudson	5	Box	60,000	St. und'frame	36,000	Miner	Arch bar	Winslow	Company shops
	6	Hopper	85,000	St. und'frame	36,900	Miner	Arch bar	Winslow	Company shops
Delaware, Lack. & Western	20	Caboose	60,000	Steel frame	43,200	Cardwell	.....	.....	Mt. Vernon
El Paso & Southwestern	75	Tank	10,000g.	Steel	.....	Cardwell	Andrews	.....	Gen. American
Erie	1,000	Gondola	100,000	Steel	43,700	Miner	.....	.....	Std. Steel
	1,000	Box	80,000	Steel frame	41,000	Miner	Arch bar	.....	Std. Steel
	70	Caboose	60,000	St. ctr. sills	37,800	Miner	Arch bar	.....	Company shops.

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roof	Builder
Florida East Coast	10	Caboose	60,000	St. und'frame	.....	Miner	Cast steel	.....	Mt. Vernon
	10	Tank	100,000	Steel	.....	Miner	Cast steel	.....	Am. Car & Fdy.
	500	Vent. Box	80,000	St. und'frame	.....	Friction	Cast steel	Hutchins	Std. Steel
Grand Trunk (Western)	2,000	Auto	80,000	Steel frame	45,700	Miner	Arch bar	Hutchins	Am. Car & Fdy.
	2	Idler	80,000	.....	.....	.....	.....	.....	Company shops
Great Northern	500	Ore	140,000	Steel	40,400	Cardwell	.....	.....	Am. Car & Fdy.
	500	Ore	140,000	Steel	39,200	Cardwell	.....	.....	Haskell & Barker
Gulf Coast Lines	250	Gondola	80,000	Composite	.....	Friction	.....	.....	Mt. Vernon
	500	Box	80,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
	50	Auto	80,000	St. und'frame	.....	Friction	.....	.....	Am. Car & Fdy.
	50	Tank	100,000	Steel	.....	Friction	.....	.....	Std. Tank Car
Illinois Central	1,000	Refrig.	80,000	St. und'frame	55,000	Murray	.....	Murphy	Pullman
	300	Stock	80,000	Steel frame	40,000	Murray	.....	.....	Am. Car & Fdy.
	200	Flat	100,000	Steel	32,000	Murray	.....	.....	Bettendorf
Louisville & Nashville	1,500	Hopper	110,000	Steel	41,500	Miner	Cast steel	.....	Am. Car & Fdy.
	500	Hopper	110,000	Steel	41,500	Friction	Cast steel	.....	Mt. Vernon
Maine Central	110	Rack	60,000	St. und'frame	38,000	Miner	Fox	.....	Laconia
Michigan Central	1,000	Auto	100,000	Steel	47,700	Friction	Cast steel	Metal	Am. Car & Fdy.
	500	Hopper	110,000	Steel	41,100	Friction	Cast steel	.....	Pressed Steel
	100	Stock	80,000	St. und'frame	39,500	Spring	Cast steel	.....	Haskell & Barker
	100	Stock	80,000	St. und'frame	42,300	Spring	Cast steel	.....	Haskell & Barker
	250	Refrig.	69,000	St. und'frame	56,300	Friction	Cast steel	Metal	Merchants Des.
	10	Caboose	.....	St. und'frame	.....	Spring	Cast steel	Wood	Company shops
	35	Caboose	.....	St. und'frame	.....	Spring	Cast steel	Wood	Company shops
Minneapolis & St. Louis	250	Gondola	100,000	St. und'frame	43,700	Friction	Cast steel	.....	Magor
Minn., St. Paul & S. S. Marie	250	Box	80,000	St. und'frame	41,100	Cardwell	Cast steel	.....	Haskell & Barker
	250	Box	80,000	St. und'frame	41,100	Miner	Cast steel	.....	Haskell & Barker
	300	Ore	100,000	Steel	33,500	Cardwell	Cast steel	.....	Haskell & Barker
Nashville, Chattanooga & St. L.	100	Hopper	110,000	Steel	40,900	Farlow	Arch bar	.....	Pressed Steel
New York Central	1,000	Box	100,000	Steel	47,300	Friction	Cast steel	Steel	Std. Steel
	250	Auto	100,000	Steel	.....	Friction	Cast steel	Steel	Std. Steel
	750	Auto	100,000	Steel	47,700	Friction	Cast steel	Metal	Am. Car & Fdy.
	1,500	Hopper	110,000	Steel	41,200	Friction	Cast steel	.....	Std. Steel
	500	Stock	80,000	St. und'frame	.....	Spring	Cast steel	.....	Merchants Des.
	200	Stock	80,000	St. und'frame	42,300	Spring	Cast steel	.....	Haskell & Barker
	80	Caboose	.....	St. und'frame	.....	Spring	Cast steel	.....	Company shops
N. Y., New Haven & Hartford	39	Snow plow	.....	.....	.....	.....	.....	.....	Osgood-Bradley
Northern Pacific	300	Convertible	100,000	Steel frame	51,200	Miner	Cast steel	.....	Am. Car. & Fdy.
	90	Caboose	60,000	St. ctr. sills	38,000	Miner	Cast steel	.....	Pac. Car & Fdy.
Pennsylvania	50	Caboose	.....	St. und'frame	35,000	Friction	Cast steel	.....	Company shops
Philadelphia & Reading	20	Caboose	.....	St. und'frame	24,000	Spring	Cast steel	.....	Company shops
Pittsburgh & Lake Erie	1,500	Hopper	110,000	Steel	41,100	Friction	Cast steel	.....	Std. Steel
Pittsburgh & Shawmut	1	Scale test	.....	Steel	.....	Friction	Cast steel	.....	Am. Car & Fdy.
	6	Caboose	.....	Wood	.....	Friction	Cast steel	.....	Am. Car & Fdy.
Richmond, Fred. & Potomac	50	Hop. bodies	110,000	Steel	40,000	Farlow	Arch bar	.....	Pressed Steel
San Antonio & Aransas Pass	15	Tank	80,000	St. ctr. sills	44,500	Miner	Arch bar	.....	.....
Southern Pacific	2,000	Box	80,000	.....	.....	.....	.....	.....	Company shops
	1,000	Stock	80,000	.....	.....	.....	.....	.....	Company shops
	1,000	Flat	100,000	.....	.....	.....	.....	.....	Company shops
	65	Caboose	.....	.....	.....	.....	.....	.....	Company shops
	250	Ballast	100,000	.....	.....	.....	.....	.....	Mt. Vernon
	500	Auto	100,000	.....	.....	.....	.....	.....	Std. Steel
	500	Box	.....	Wood	.....	.....	.....	.....	Std. Steel
Texas & Pacific	50	Tank	100,000	Steel	45,000	Cardwell	Vulcan	.....	Am. Car & Fdy.
	200	Ballast	100,000	St. und'frame	46,700	Cardwell	Vulcan	.....	Am. Car & Fdy.
Toledo, St. Louis & Western	100	Hopper	110,000	Steel	40,700	Westinghouse	.....	.....	Am. Car & Fdy.
Union Pacific	500	Gondola	100,000	Steel	42,810	Murray	Bettendorf	.....	Pullman
	500	Gondola	100,000	Steel	42,810	Cardwell	Bettendorf	.....	Pullman
	1,000	Gondola	100,000	Steel	42,810	Cardwell	Vulcan	.....	Ralston
	45	Caboose	.....	St. und'frame	36,600	Cardwell	Vulcan	.....	Pac. Car & Fdy.
	24	Dump	80,000	Steel	51,900	Farlow	Arch bar	.....	Kilb. & Jacobs
	45*	Steel underframes for caboose cars			.....	.....	.....	.....	Bettendorf
Utah	2	Caboose	60,000	St. und'frame	36,900	Farlow	Cast steel	Wood	Mt. Vernon
Virginian	500	Coal	240,000	Steel	78,200	Cardwell	Lewis	.....	Pressed Steel
	500	Coal	240,000	Steel	78,200	Westinghouse	Buckeye	.....	Pressed Steel
Western Pacific	700	Gondola	100,000	St. und'frame	41,600	Farlow	Arch bar	.....	Pressed Steel
Wheeling & Lake Erie	500	Box	80,000	Steel frame	42,000	Cardwell	Bettendorf	Hutchins	Pressed Steel
	500	Box	80,000	Steel frame	42,000	Cardwell	Bettendorf	Hutchins	Am. Car. & Fdy.
	1,500	Gondola	100,000	Steel	43,500	Cardwell	Bettendorf	Hutchins	Std. Steel
	500	Gondola	100,000	Steel	43,500	Cardwell	Bettendorf	Hutchins	Pressed Steel

*Not included in totals.

Other United States Railroads

Alton & Southern	25	Hopper	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon
Bangor Ry. & Elec. Co	3	Box	50,000	Wood	.....	Spring	.....	.....	Am. Car & Fdy.
	3	Flat	50,000	Wood	.....	Spring	.....	.....	Am. Car & Fdy.
Batesville & So'western	40	Flat	60,000	Wood	28,000	Miner	Arch bar	.....	Company shops
	2	Ballast	60,000	Wood	31,000	.....	.....	.....	Company shops
Brimstone R. R. & Canal Co.	36	Hop. body	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Charlotte Harbor & Northern	100	Cov. Hop.	100,000	Steel	44,000	Farlow	Arch bar	Iron	Pressed Steel
Clarendon & Pittsford	4	Hopper	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon
East Jersey	25	Tank	100,000	Steel	45,000	Cardwell	Arch bar	Steel	Am. Car & Fdy.
Escambia	25	Logging	60,000	Wood	28,000	.....	Arch bar	.....	Am. Car & Fdy.
Interstate R. R.	510	Steel	110,000	Steel	40,000	Farlow	Arch bar	.....	Pressed Steel
Miss. River & Bonne Terre	1	Caboose	.....	St. und'frame	46,100	Miner	Arch bar	.....	Am. Car & Fdy.
Piedmont & Northern	50	Flat	80,000	Composite	.....	.....	.....	.....	Pressed Steel
Puget Sound & Cascade	10	Flat	80,000	Steel	27,000	.....	.....	.....	Company shops
Riora, Tiera & Van Tw. Ry.	50	Flat	80,000	Steel frame	.....	Spring	.....	.....	Mt. Vernon
Salt Lake & Utah	50	Gen'l service	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	10	Box	80,000	Wood	.....	.....	.....	.....	Pressed Steel
Utah-Idaho Central	100.	Gondola	100,000	Steel	.....	.....	.....	.....	Ralston

Private Car Lines and Industrials

Acar Mfg. Co	18	Tank	10,300g.	.....	.....	.....	.....	.....	Penn. Tank Car
	22	Tank	10,000g.	.....	.....	.....	.....	.....	Penn. Tank Car
	50	Tank	8,000g.	.....	.....	.....	.....	.....	Penn. Tank Car
	35	Tank	10,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
	65	Tank	8,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
Aetna Refining Co	50	Tank	10,000g.	Steel	.....	.....	.....	.....	Std. Tank Car
Allegheny Pl. Glass Co	10	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Aluminum Co. of America	25	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
	100	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
American Cyanamid Co	10	Hopper	140,000	.....	57,500	Cardwell	.....	.....	Gen. American
Amer. Steel & Wire Co	250	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
American Tar Prod. Co	10	Tank	10,000g.	.....	.....	.....	.....	.....	Std. Tank Car
Anderson & Gustafson	50	Tank	100,000	Steel	46,100	Cardwell	Arch bar	.....	Std. Tank Car
Argent Lbr. Co	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Armour Car Lines	400*	Underframes for beef cars.		.....	.....	.....	.....	.....	Bettendorf
Ashley Lbr. Co	4	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Asteria Lgt., Ht. & Power Co.	4	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Atkins & Co.	2	Box	60,000	Steel	.....	.....	.....	.....	Pressed Steel
Barnes Circus	6	Flat	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
	1	Stock	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
Barrett Co.	50	Tank	10,000g.	Steel	.....	Cardwell	.....	.....	Gen. American
Barr-Holaday Lbr. Co.	5	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Bayou Land & Lbr. Co.	10	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Bee-Tree Lbr. Co.	5	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Bertha Coal Co.	100	Hopper	140,000	Steel	.....	.....	.....	.....	Ralston
Bethlehem Steel Co.	1,000	Hopper	140,000	Steel	.....	.....	.....	.....	Cambria Steel
Bigheart Prod. & Ref. Co.	250	Tank	.....	.....	.....	.....	.....	.....	Penn. Tank Car
Black Warrior Lbr. Co.	6	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Boone Fork Lbr. Co.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Briar Hill Steel Co.	54	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	100	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Brown & Sons Lbr. Co., W. P.	15	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Buckeye Steel Castings Co.	6	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	18	Gondola	140,000	Steel	.....	.....	.....	.....	Ralston
Byers & Co., A. M.	115	Hopper	140,000	Steel	.....	.....	.....	.....	Std. Steel
Caddo Cent. Oil & Refin. Co.	400	Tank	80,000	Steel	40,500	Cardwell	Arch bar	.....	Std. Tank Car
Candler Lbr. Co.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Carnegie Steel Co.	500	Hopper	110,000	Steel	.....	.....	.....	.....	Std. Steel
	32	Tank	100,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
Carrier Lbr. Co.	10	Logging	50,000	Wood	.....	.....	.....	.....	Kilby Car
Carson Petroleum Co.	8	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	2	Tank	8,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Central Refining Co.	20	Tank	80,000	Steel	39,000	Bradford	Arch bar	.....	Chic. Steel Car
Central Timber Saw Mill Co.	12	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Cheswick & Harmar	25	Hopper	110,000	Steel	.....	.....	.....	.....	Std. Steel
Chestnut & Smith Corp.	100	Tank	8,000g.	Steel	42,000	Cardwell	Arch bar	.....	Gen. American
Clark Car Co.	250	Gondola	100,000	Steel	.....	.....	.....	.....	Cambria Steel
	12	Gondola	100,000	Steel	.....	.....	.....	.....	Cambria Steel
Clinchfield Carbocoal Co.	10	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Clinchfield Port. Cement Co.	45	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Champlin Ref. Co.	100	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Chickasaw Ref. Co.	100	Tank	8,080g.	Steel	.....	Cardwell	Arch bar	.....	Am. Car & Fdy.
Choate Oil Corp.	10	Tank	80,000	Steel	40,500	Cardwell	Scullin	.....	Std. Tank Car
	10	Tank	100,000	Steel	44,800	Cardwell	Buckeye	.....	Std. Tank Car
Clarkson Coal Mining Co.	500	Hopper	110,000	.....	.....	.....	.....	.....	Haskell & Barker
Clements & Son	10	Tank	10,000g.	.....	.....	.....	.....	.....	Chic. Steel Car
Columbia Steel & Shafting Co.	50	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Commerce Transport System.	50	Tank	100,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Commercial Car Line	10	Tank	100,000	Steel	.....	Bradford	Arch bar	.....	Gen. American
	25	Tank	100,000	Steel	.....	Bradford	Arch bar	.....	Penn. Tank Car
Conly Car Co.	125	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Consolidated Coal Co.	110	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Consolidated Land Co.	40	Logging	60,000	Wood	.....	.....	.....	.....	Kilby Car
Contact Process	2*	Underframes for tank cars.			.....	.....	.....	.....	Bettendorf
Coopers Creek Chemical Co.	9	Tank	100,000	Steel	47,400	Cardwell	Arch bar	.....	Penn. Tank Car
Craig Oil Company	30	Tank	10,000g.	Steel	43,500	Cardwell	Arch bar	.....	Am. Car & Fdy.
Crescent Portland Cement Co.	5	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Crystal Car Line	50	Tank	100,000	Steel	40,000	Cardwell	Arch bar	.....	Gen. American
Deal-Batchell Lbr. Co.	4	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Detroit City Gas Co.	1	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Detroit Edison Co.	6	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Diamond Alkali Co.	100	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Dickey, Clay Mfg. Co., W. S.	2	Tank	10,100g.	.....	.....	.....	.....	.....	Penn. Tank Car
Donner Steel Co.	250	Hopper	140,000	Steel	.....	.....	.....	.....	Std. Steel
	20	Gondola	140,000	Steel	.....	.....	.....	.....	Cambria
Donner Union Coke Corp.	250	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
El Dorado Refining Co.	100	Tank	80,000	Steel	.....	Cardwell	Arch bar	.....	Std. Tank Car
Electro Bleaching Gas Co.	5	Tank	.....	.....	.....	.....	.....	.....	Gen. American
Elk Refining Co.	25	Tank	80,000	Steel	40,400	Friction	Arch bar	.....	Std. Tank Car
Elliott Jones & Co., Inc.	111	.....	100,000	Steel	45,000	National	.....	.....	Std. Tank Car
Emlenton Ref. Co.	1	Tank	80,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Fair Lbr. Co., D. L.	18	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Faulkner Candy Co.	2	Box	80,000	Wood	.....	Friction	.....	.....	Mt. Vernon
Federal Shipbuilding Co.	16	Flat	100,000	Steel	.....	.....	.....	.....	Std. Steel
	20	Gondola	100,000	Steel	.....	.....	.....	.....	Std. Steel
Finkbine Lumber Co.	20	Logging	80,000	Steel	.....	.....	.....	.....	Kilby Car
Flint Lbr. Co.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
General Chemical	50	Tank	140,000	Steel	50,500	Cardwell	Arch bar	.....	Am. Car & Fdy.
	50	Tank	80,000	Steel	60,500	Cardwell	Arch bar	.....	Gen. American
Federal Tank Car Line	48	Tank	100,000	Steel	45,900	Cardwell	Cast steel	.....	Std. Tank Car
	78	Tank	100,000	Steel	45,500	Cardwell	Arch bar	.....	Am. Car & Fdy.
	50	Tank	100,000	Steel	45,900	Cardwell	Cast steel	.....	Std. Tank Car
Foco Oil Co.	5	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Foreman-Blades Lbr. Co.	12	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Franklin Quality Refin. Co.	20	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Frost-Sibley Lbr. Co.	1	Flat	50,000	St. und'frame	.....	.....	.....	.....	Kilby Car
Georgia Rosin & Prod. Co.	3	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Gillespie & Sons	28	Tank	100,000	Steel	.....	Cardwell	Arch bar	.....	Am. Car & Fdy.
Glen Nina Tank Line	55	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Golden Saw Mill Co.	4	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Goldsboro Lbr. Co.	20	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Gosa Tbr. Co., H. O.	4	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Great American Ref. Co.	100	Tank	8,000g.	.....	.....	.....	.....	.....	Gen. American
Griffin, J. P.	3	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Hamburg Lbr. Co.	6	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Hahmon & Richards	30	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Hanna Co., M. A.	40	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Hassler & Co., R. H.	1	Box	.....	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Herf & Frederichs Chem. Co.	8	Tank	10,100g.	.....	.....	.....	.....	.....	Penn. Tank Car
Heth Circus	2	Flat	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
Holly-Ridge Lbr. Co.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Homer-Laughlin China Co.	20	Hopper	140,000	Steel	.....	.....	.....	.....	Ralston
Howell Lbr. Co.	3	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Humble Oil & Ref. Co.	50	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
	20	Tank	8,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
Ill. Oil Co. of Rock Island.	35	Tank	80,000	Steel	.....	.....	.....	.....	Chic. Steel Car
Imperial Refining Co.	50	Tank	80,000	Steel	40,500	Cardwell	Arch bar	.....	Std. Tank Car
Indiahoma Ref. Co.	100	Tank	100,000	Steel	46,000	Cardwell	Cast steel	.....	Std. Tank Car
	50	Tank	100,000	Steel	45,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
Indian Refining Co.	150	Tank	80,000	Steel	40,500	National	Buckeye	.....	Std. Tank Car
	50	Tank	80,000	Steel	40,500	Cardwell	Buckeye	.....	Std. Tank Car
	18	Tank	100,000	Steel	41,500	Bradford	Arch bar	.....	Chic. Steel Car
	2	Tank	100,000	Steel	41,650	Bradford	Arch bar	.....	Chic. Steel Car
Inland Steel Co.	20	Gondola	140,000	Steel	.....	Friction	.....	.....	Bettendorf
International Harvester Co.	500	Hopper	110,000	Steel	.....	.....	.....	.....	Standard Steel
Internat'l Lead Co.	1	Box	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
Inter Ocean Ref. Co.	50	.....	80,000	Steel	40,800	Cardwell	Arch bar	.....	Std. Tank Car
	50	.....	100,000	Steel	45,700	Cardwell	Arch bar	.....	Std. Tank Car
Interstate Pub. Service Co.	15	Box	60,000	.....	.....	.....	.....	.....	Interstate
Invincible Oil Co.	75	Tank	8,000g.	Steel	.....	.....	Arch bar	.....	Gen. American
	25	Tank	10,000g.	Steel	.....	.....	Arch bar	.....	Gen. American

*Not included in totals.

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Ivor Stave & Tbr. Co.	6	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Jackson Bros. Lbr. Co.	1	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Kelley Lbr. Co.	6	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Kendall Ref. Co.	3	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Kuhns Lbr. Co., W. T.	6	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Lames Hand	5	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Levi Smith Ref. Co.	3	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Lidgerwood Mfg. Co.	88	Flat	100,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
Konsburg, A. V.	4	Tank	100,000	Steel	.....	.....	.....	.....	Standard Steel
Koppers Co.	100	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
	4	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
	900	Hopper	110,000	Steel	.....	.....	.....	.....	Standard Steel
	1	Flat	100,000	Steel	.....	.....	.....	.....	Standard Steel
Labelle Iron Works.	50	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Lancaster Foundry Co.	2	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
McKinney Steel Co.	400	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
	100	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
Magnetic Pigment Co.	1	Tank	100,000	.....	.....	.....	.....	.....	Penn. Tank Car
Magnolia Petroleum Co.	25	Tank	80,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	100	Tank	80,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	250	Tank	100,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Marcus Ruth Jerome Co.	3	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Merchants Despatch Trans. Co.	250*	Underframes for refrigerator cars.			.....	.....	.....	.....	Bettendorf
Moore & Co., E. M.	2	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Mudge & Co., E. W.	240	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
Nacatee Crate Co.	5	Logging	50,000	Wood	.....	.....	.....	.....	Kilby Car
National Lamp Co.	8	Tank	8,050g.	St. und'frame	.....	.....	.....	.....	Penn. Tank Car
National Zinc Co.	1	Tank	62,000	St. und'frame	65,000	Cardwell	Arch bar	.....	Kan. C. Struct. St.
New Jersey Zinc Co.	45	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	10	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Newport Rolling Mill Co.	1	Flat	200,000	Steel	.....	.....	.....	.....	Pressed Steel
New York Shipbuilding Co.	35	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Noble Oil & Gas Co.	200	Tank	8,000g.	Steel	.....	.....	.....	.....	F. A. H. Corp.
	100	Tank	8,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	100	Tank	8,000g.	Steel	.....	.....	.....	.....	F. A. H. Corp.
	50	Tank	8,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	50	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
North Carolina Lbr. Co.	14	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Northern Petroleum Co.	20	Tank	8,050g.	.....	.....	.....	.....	.....	Penn Tank Car
Nufer, Wm. L.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Nunn & Co., E. F.	2	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
	2	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Oliver Iron Mining Co.	65	Dump	.....	.....	.....	.....	.....	.....	Magor
	65	Dump	.....	.....	.....	.....	.....	.....	West. Whl. Sc.
Otis Steel Co.	7	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
	5	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Pacific Fruit Express.	300	Refrig.	60,000	St. und'frame	52,200	Cardwell	Vulcan	Murphy	Mt. Vernon
	200	Refrig.	60,000	St. und'frame	52,400	Cardwell	Vulcan	Murphy	Pac. Car & Fdy.
	600	Refrig.	60,000	St. und'frame	52,700	Cardwell	Vulcan	Murphy	Am. Car & Fdy.
	300	Refrig.	60,000	St. und'frame	53,700	Cardwell	Vulcan	Murphy	Am. Car & Fdy.
	900	Refrig.	60,000	St. und'frame	52,300	Cardwell	Vulcan	Murphy	Pullman
	1,000	Refrig.	60,000	St. und'frame	52,100	Cardwell	Vulcan	Murphy	Company shops
	700	Refrig.	60,000	St. und'frame	52,300	Cardwell	Vulcan	Murphy	Haskell & Barker
	3,000*	Underframes for refrigerator cars.			53,500	.....	.....	.....	Bettendorf
Pan Handle Refin. Co.	50	Tank	8,000g.	Steel	40,000	Cardwell	Arch bar	.....	Std. Tank Car
	50	Tank	10,050g.	Steel	44,000	Cardwell	Arch bar	.....	Std. Tank Car
	5	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
Paragon Refining Co.	100	Tank	10,000g.	Steel	45,700	Cardwell	Arch bar	.....	Std. Tank Car
Parker Lbr. Wks., S. M.	3	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Pease, L. A.	50	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Peerless Transit	25	Tank	80,000	Steel	48,000	National	Arch bar	.....	Std. Tank Car
	50	Tank	80,000	Steel	46,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
Penick & Ford Tank Line.	40	Tank	8,000g.	Steel	39,500	Cardwell	Arch bar	.....	Gen. American
Penn-Jarratt Lbr. Co.	6	Logging	50,000	Wood	.....	.....	.....	.....	Kilby Car
Phelps-Dodge	2	Tank	.....	.....	.....	.....	.....	.....	Gen. American
Pickands, Mather & Co.	412	Hopper	140,000	Steel	.....	.....	.....	.....	Cambria
Pittsburgh Crucible Co.	25	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
	10	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Pittsburgh Plate Glass Co.	20	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
Planters Nut & Choc. Co.	4	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Poinsett Lbr. Co.	14	Logging	80,000	Steel	.....	Spring	.....	.....	Bettendorf
Priscilla Coal & Coke Co.	40	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Procter & Gamble Co.	5	Gondola	100,000	Steel	.....	.....	.....	.....	Ralston
Prudential Oil Corp.	100	Tank	80,000	Steel	40,800	Farlow	Arch bar	.....	Am. Car & Fdy.
Public Service Electric Co.	600	Hopper	110,000	Steel	.....	.....	.....	.....	Standard Steel
Pure Oil Co.	250	Tank	8,000g.	Steel	.....	Cardwell	Arch bar	.....	Am. Car & Fdy.
Rainey Wood Coke Co.	400	Hopper	140,000	Steel	.....	.....	.....	.....	Cambria
Rajah Oil & Ref. Co.	2	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Rathborne Lbr. Co., J.	20	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Red River Refining Co.	50	Tank	10,000g.	All steel	40,000	Cardwell	Arch bar	.....	Gen. American
Reed Circus Co.	3	Flat	80,000	All steel	.....	Friction	.....	.....	Mt. Vernon
Republic Iron & Steel Co.	160	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Roanoke R. R. & Lbr. Co.	12	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Robinson & Co., D. P.	3	Hopper	40,000	.....	.....	.....	.....	.....	Magor
Robinson's Circus	6	Flat	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
	4	Stock	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
Robinson Clay Prod. Co.	2	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Rogers, Brown Iron Co.	4	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	6	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Roxana Petroleum Co.	125	Tank	80,000	Steel	41,000	Cardwell	Arch bar	.....	Std. Tank Car
	75	Tank	100,000	Steel	45,000	Cardwell	Arch bar	.....	Std. Tank Car
Sartin Mill Co.	4	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Schryver Lbr. Co., A. C.	6	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Sharon Steel Hoop Co.	10	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Simms Oil Co.	300	Tank	10,000g.	St. und'frame	45,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
	300	Tank	10,000g.	St. und'frame	45,000	.....	.....	.....	Std. Tank Car
Sinclair Refining Co.	6	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	6	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
	500	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	300	Tank	10,000g.	Steel	.....	.....	.....	.....	Gen. American
	240	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
	10	Tank	8,000g.	Steel	.....	.....	.....	.....	Company shops
Sloan & Zook.	5	Tank	8,000g.	.....	.....	.....	.....	.....	Gen. American
Sloss-Sheffield Steel & Iron Co.	25	Coke	100,000	.....	.....	.....	.....	.....	Pressed Steel
Snyder, T. E.	5	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
South Atlantic Lbr. Co.	2	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Sou. Gem Coal Co.	25	Hopper	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon
Southern Extract	10	Tank	80,000	Steel	38,000	.....	.....	.....	Am. Car & Fdy.
Sparks Circus.	4	Flat	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
	5	Stock	80,000	Steel frame	.....	Spring	.....	.....	Mt. Vernon
Staley Mfg. Co., A. E.	60	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Standard Oil Co.	6	Gondola	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon
Standard Oil of Ind.	500	Gondola	.....	.....	.....	.....	.....	.....	Gen. American
Standard Plate Glass Co.	4	Gondola	140,000	Steel	.....	.....	.....	.....	Standard Steel

*Not included in totals.

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Standard Tin Plate Co.	3	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Struthers Furnace Co.	20	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
	60	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Surry Lbr. Co.	55	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Taylor, Lowenstein & Co.	5	Tank	80,000	St. und'frame	.....	Cardwell	Metal	.....	Am. Car & Fdy.
Tenn. Coal, Iron & R. R. Co.	30	Coke	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Texas Co.	400	Tank	80,000	Steel	39,000	Cardwell	Arch bar	.....	Gen. American
	400	Tank	80,000	Steel	45,000	Cardwell	Arch bar	.....	Gen. American
	11	Tank	100,000	Steel	45,500	Cardwell	Arch bar	.....	Penn. Tank Car
	52	Tank	100,000	Steel	42,000	Cardwell	Arch bar	.....	Penn. Tank Car
	137	Tank	100,000	Steel	43,000	Cardwell	Arch bar	.....	Penn. Tank Car
	100	Tank	80,000	Steel	40,000	Cardwell	Arch bar	.....	Penn. Tank Car
Thayer Mfg. Co.	5	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Tidal Gasoline Co.	25	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Std. Tank Car
	60	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
	65	Tank	8,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
	115	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
Tidewater Oil Co.	100	Tank	.....	.....	.....	.....	.....	.....	Gen. American
Tyler & Co.	5	Logging	80,000	Steel	.....	Spring	.....	.....	Bettendorf
	1	Box	100,000	Steel	.....	Spring	.....	.....	Bettendorf
Union Coal & Coke	250	Gondola	.....	.....	.....	.....	.....	.....	Cambria
Union Coal & Coke Co.	3	Hopper	140,000	Steel	.....	.....	.....	.....	Cambria
U. S. Stores Co.	11	Box	80,000	Steel frame	.....	Friction	.....	.....	Cambria
Union Tank Car Co.	1,000	Tank	80,000	Steel	.....	Cardwell	Side frame cast steel	.....	Gen. American
	2,000	Tank	100,000	Steel	.....	Cardwell	Side frame cast steel	.....	Gen. American
	250	Tank	80,000	Steel	.....	Cardwell	Side frame cast steel	.....	Std. Tank Car
	450	Tank	100,000	Steel	.....	Cardwell	Side frame cast steel	.....	Std. Tank Car
	200	Tank	80,000	Steel	.....	Cardwell	Side frame cast steel	.....	Penn. Tank Car
United Alloy Steel Co.	15	Gondola	100,000	Steel	.....	.....	.....	.....	Ralston
Universal Steel Co.	2	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Walsh, J. R.	3	Tank	.....	.....	.....	.....	.....	.....	Penn. Tank Car
Warner Co., W. H.	150	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Warner-Quinlan Co.	50	Tank	100,000	Steel	40,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
Waverly Oil Wks.	14	Tank	.....	.....	.....	.....	.....	.....	Penn. Tank Car
Western Oil Corp.	25	Tank	8,000g.	.....	.....	.....	.....	.....	Gen. American
Westmoreland Coal Co.	150	Hopper	.....	Steel	.....	Friction	.....	.....	Pressed Steel
West Va. Pulp & Paper Co.	25	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Weirton Steel Co.	2	Flat	200,000	Steel	.....	Westinghouse	Arch bar	.....	Pressed Steel
	240	Hopper	140,000	Steel	.....	Westinghouse	.....	.....	Standard Steel
Westinghouse Elec. & Mfg. Co.	1	Flat	150,000	Steel	.....	.....	.....	.....	Standard Steel
Westinghouse Elec.	3	Dump	.....	Steel	.....	.....	.....	.....	Federal Equip't
	2	Transformer	150,000	Steel	46,200	.....	Cast steel	.....	Atlas Steel Car
	1	Transformer	190,000	Steel	46,200	.....	Cast steel	.....	Atlas Steel Car
	1	Well	150,000	Steel	.....	.....	.....	.....	Atlas Steel Car
West Va. Tbr. Co.	20	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Whitaker-Glessner Co.	50	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
	140	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Whiteville Lbr. Co.	5	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Whiting, Wm. S.	20	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Williams Lbr. Co.	35	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Wilson & Co.	35	Refrig.	60,000	Wood	.....	.....	.....	.....	Standard Steel
Wilson Cypress Co.	15	Logging	60,000	Wood	.....	.....	.....	.....	Kilby Car
Winyah Lbr. Co.	6	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Young & Co., J. S.	4	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Youngstown Sheet & Tube Co.	500	Hopper	140,000	Steel	.....	.....	.....	.....	Cambria
Various Purchasers	1,573	Orders not reported in detail			.....	.....	.....	.....	Am. Car & Fdy.
	739	Orders not reported in detail			.....	.....	.....	.....	Pac. Car & Fdy.
	2,104	Orders not reported in detail			.....	.....	.....	.....	Gen. American

*Not included in totals.

Railroads and Other Companies in Canada

Canadian National	350	Ballast	100,000	Wood	43,200	Murray	Arch bar	.....	Hart-Otis
	650	Gondola	100,000	St. und'frame	43,700	Universal	Arch bar	.....	Eastern
	1,500	Box	80,000	Steel frame	39,300	Miner	Arch bar	Chicago	National
	1,000	Box	80,000	Steel frame	39,300	Miner	Arch bar	Chicago	Can. Car & Fdy.
	6	Snow Plow	.....	Steel	.....	.....	.....	.....	Eastern
	500	Box	80,000	Steel frame	39,300	Miner	Arch bar	Chicago	Eastern
	500	Refrig.	80,000	Wood	53,500	Miner	Simplex	.....	Can. Car & Fdy.
	150	Stock	60,000	Wood	.....	Miner	Simplex	.....	Can. Car & Fdy.
	80	Caboose	60,000	Wood	39,300	Miner	Simplex	.....	Can. Car & Fdy.
	20	Caboose	60,000	Wood	39,300	Miner	Simplex	.....	Preston
Canadian Pacific	500	Box	120,000	Steel frame	47,500	Murray	Arch bar	Murphy	Eastern
	5	Flat	80,000	Steel	44,000	Miner	.....	.....	Company shops
	500	Refrig.	60,000	St. und'frame	61,000	Cardwell	Arch bar	Murphy	Company shops
	500	Auto	80,000	Steel frame	47,400	Cardwell	.....	Hutchins	Company shops
	3,000	Box	120,000	Steel frame	47,500	Murray	Arch bar	Murphy	National and Can.
Dominion Iron & Steel Co.	10	Service	100,000	Steel frame	.....	Friction	.....	.....	Eastern
	30	Flat	100,000	Steel	.....	Friction	.....	.....	Eastern
Imperial Oil Co.	75	Tank	5,400g.	Steel	.....	.....	.....	.....	Can. Car & Fdy.
	100	Tank	8,400g.	Steel	.....	.....	.....	.....	Can. Car & Fdy.
	125	Tank	8,400g.	Steel	.....	.....	.....	.....	Can. Car & Fdy.
Grand Trunk	1,000	Auto	80,000	Steel frame	45,700	Miner	Arch bar	Hutchins	Can. Car & Fdy.
	1,000	Flat	100,000	Steel frame	35,500	Miner	Arch bar	.....	National
Grand Trunk Pacific	500	Gondola	100,000	St. und'frame	43,700	Universal	Arch bar	.....	Eastern
	100	Refrig.	80,000	Wood	53,500	Miner	Arch bar	.....	Can. Car & Fdy.
	200	Stock	60,000	Wood	37,200	Miner	Simplex	.....	Can. Car & Fdy.
Pacific Great Eastern	3	Caboose	.....	Wood	.....	Miner	Arch bar	.....	Can. Car & Fdy.
Roberval-Saguenay	2	Flat	40,000	Wood	25,000	.....	.....	.....	.....

Export

Argentine State Rys.	250	Box	60,000	Wood	.....	.....	.....	.....	Standard Steel
	250	Gondola	60,000	Wood	.....	.....	.....	.....	Standard Steel
Baldwin Loco. Works (for Cuba)	15	Cane	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Benguella Ry.	20	Gondola	70,000	Steel	.....	.....	.....	.....	Fressed Steel
Blanco & Bro.	10	Flat	60,000	St. frame	.....	.....	.....	.....	Kilby Car
Burma Corporation	50	Ore	40,000	Steel	.....	.....	.....	.....	Pressed Steel
Central Algodones (Cuba)	20	Box	60,000	Steel	.....	.....	.....	.....	Pressed Steel
Central Camaguey (Cuba)	15	Cane	50,000	.....	.....	.....	.....	.....	Magor
Central Macaguay (Cuba)	10	Cane	.....	.....	.....	.....	.....	.....	Magor
Central Romelie (Cuba)	10	Cane	.....	.....	.....	.....	.....	.....	Magor
Central Santa Catalina	50	Cane	60,000	Steel	.....	.....	.....	.....	Kilby Car
Central Santa Maria (Cuba)	50	Cane	.....	.....	.....	.....	.....	.....	Magor
Central Sofia Oriente	12	Cane	60,000	Steel	.....	.....	.....	.....	Kilby Car
Chile Exploration Co.	35	Tank	.....	.....	.....	.....	.....	.....	Standard Steel
Cintas, O. B. (Cuba)	20	Tank	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	10	Flat	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Cuba Cane Sugar Corp.	150	Cane	.....	.....	.....	.....	.....	.....	Magor
	25	Box	60,000	Steel Supr.	.....	.....	.....	.....	Pressed Steel

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Cuba Northern Ry.	10	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	15	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	350	Box	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Cane	80,000	Wood	.....	Friction	.....	.....	Am. Car & Fdy.
Cuba R. R.	500	Box	80,000	Composite	29,500	Cardwell	Arch bar	Hutchins	Am. Car & Fdy.
	50	Tank	100,000	Steel	.....	Cardwell	Arch bar	.....	Am. Car & Fdy.
F. C. de Amaga (Columbia)	6	Flat	40,000	Wood	.....	.....	.....	.....	Standard Steel
	6	Box	40,000	Wood	.....	.....	.....	.....	Standard Steel
	6	Gondola	40,000	Wood	.....	.....	.....	.....	Standard Steel
	10	Stock	40,000	Wood	.....	.....	.....	.....	Standard Steel
Fox Bros. & Co. (for Cuba)	100	Cane	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Grace & Co., W. R.	25	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Havana Central	75	Hopper	80,000	Steel	.....	.....	.....	.....	Standard Steel
	200	Flat	60,000	Steel	.....	.....	.....	.....	Standard Steel
	200	Box	80,000	Wood	.....	.....	.....	.....	Standard Steel
	50	Box	30,000	Wood	.....	.....	.....	.....	Standard Steel
	50	Flat	30,000	Steel	.....	.....	.....	.....	Standard Steel
	100	Flat	80,000	Steel	.....	.....	.....	.....	Standard Steel
	300	Box	60,000	St. frame	.....	.....	.....	.....	Am. Car & Fdy.
	300	Flat	50,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Howard Co., C. B.	4	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
	1	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
International Ry. Supply Co.	7	Tank	6,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
	130	Cane	24,000	.....	.....	.....	.....	.....	National
	100	Cane	50,000	.....	.....	.....	.....	.....	Gregg Co.
	25	Flat	40 000	.....	.....	.....	.....	.....	Gregg Co.
Katanga Ry.	30	Ballast	70,000	Steel	.....	.....	.....	.....	Pressed Steel
	20	Gondola	70,000	Steel	.....	.....	.....	.....	Pressed Steel
	25	Box	70,000	Steel	.....	.....	.....	.....	Pressed Steel
	10	Box	40,000	Steel	.....	.....	.....	.....	Pressed Steel
	5	Tank	.....	Steel	.....	.....	.....	.....	Pressed Steel
	12	Stock	60,000	Wood	.....	.....	.....	.....	Pressed Steel
Liberty Export & Import Co.	100	Cane	60,000	Steel	.....	.....	.....	.....	Standard Steel
Matazzaro Co. (Brazil)	4	Tank	6,575g.	Steel	.....	.....	.....	.....	Standard Steel
Middleton & Co.	10	Cane	.....	.....	.....	.....	.....	.....	Magor
Mogyano Ry. (Brazil)	20	Und'frs&trucks	.....	Steel	.....	.....	.....	.....	Standard Steel
National Rys. of Mexico	100	Tank	12,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
Netherlands Gov't	60	Gondola	.....	Steel	.....	.....	.....	.....	Standard Steel
Northwestern of Brazil	150	Box	40,000	Wood	.....	.....	.....	.....	Standard Steel
Oller, Antonio (Cuba)	15	Tank	6,000g.	.....	.....	.....	.....	.....	Am. Tank Car
Ollivier y Cia, J. (Mexico)	3	Tank	10,109g.	.....	.....	.....	.....	.....	Penn. Tank Car
So. African Rys.	60	.....	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Standard Products Corp.	20	Caboose	.....	Wood	.....	.....	.....	.....	Standard Steel
Suchi Timber Co.	10	Logging	60,000	.....	.....	.....	.....	.....	Kilby Car & Fdy.
Trinidad Gov't Lines	30	Cane	.....	.....	.....	.....	.....	.....	Magor
United Fruit Co.	25	Ballast	.....	.....	.....	.....	.....	.....	Koppel
	30	Ballast	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	100	Flat	.....	.....	.....	.....	.....	.....	Magor
	36	Banana	.....	.....	.....	.....	.....	.....	Magor
	3	Tank	5,000g.	.....	.....	.....	.....	.....	Gen. American
	50	Flat	50,000	.....	.....	.....	.....	.....	Magor
	200	Cane	.....	.....	.....	.....	.....	.....	Magor
	150	Cane	60,000	Composite	.....	.....	.....	.....	Pressed Steel
	3	Tank	5,000g.	Steel	.....	.....	.....	.....	Gen. American
United Rys. of Havana	300	Box	60,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
	300	Flat	50,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
Vanadium Corp. (for Peru)	12	Dump	.....	.....	.....	.....	.....	.....	Western Whl. Sc.
West Ind. Fin. Corp.	250	Cane	40,000	.....	.....	.....	.....	.....	Magor
	45	Flat	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	1	Tank	5 000g.	Steel	.....	.....	.....	.....	Gen. American
Various foreign purchasers	3,243	Orders not reported in detail.				.....	.....	.....	Am. Car & Fdy.

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A Scene at East Chicago

An Abandoned Southern Line

Railway Lines Abandoned During the Year 1920

Operation Was Discontinued on a Mileage Greatly Exceeding the Amount Built in the Same Period

FOR THE YEAR 1920, 535 miles of main line railways were abandoned for operation in the United States and about 35 miles in Canada. To this amount should be added a total of 178 miles of main line track upon which operation was discontinued or suspended during the latter part of 1919, notice of which, however, was received too late to be included in the tabulated data for that year. This mileage in addition to that abandoned for the year 1920 brings up the total miles abandoned since the last annual compilation to 713 miles, some 24 miles greater than that for 1919, but what is more to the point, some 400 miles more than was constructed during the same period. In other words, the lines abandoned exceed the new construction in the ratio of over two to one.

Of the total mileage abandoned for operation, slightly over 239 miles were given up completely, the equipment sold and the lines taken up or junked. Of the remaining approximately 474 miles, operation was discontinued either permanently or temporarily and in many instances petitions have been made to dismantle the roads. The mileage abandoned in Canada was greater than that reported for 1919; all of it was abandoned permanently and the lines were taken up during 1920. An interesting sidelight on this is that about 90 per cent of the abandoned mileage was on the Great Northern lines through British Columbia.

In contrast to previous years none of the so-called short lines of from 75 to 100 miles or more in length were abandoned completely and junked, the largest one being the Ocean Shore. This road operated two lines, one 38 miles long between San Francisco, Calif., and Tunitas, and the other 15.5 miles long between Swanton, Calif., and Santa Cruz, all of which was dismantled. Following that in size is the Denver, Boulder & Western operating lines from Boulder, Colo., to Eldora and from Sunset, Colo., to Ward, totaling 46 miles. Actual operation ceased on this road on August 6, 1919.

Among the lines upon which operation was discontinued but which have not been dismantled and are not very likely to be are the Illinois Southern with 136 miles of line and the Kansas City Northern with 170 miles. The first-named road has been recently resold to parties as yet unknown who expect to operate it in the near future—probably in 1921. The Kansas City Northwestern discontinued operation on November 1, 1919, because of the "shortage of coal and other financial difficulties" and it is not unlikely that under better business conditions and under the new rates operation may be resumed in the future. With the exception of these two roads, which are more temporary than permanent abandonments, a comparison of the lines discontinued or dismantled between the years 1919 and 1920 brings out an important difference.

Outside of a few roads the abandonments during the year 1919 covered practically the entire mileage of the lines listed while in 1920 the tabulation shows that in general the tendency of the year has been towards the abandonment of small sections or short extensions of existing lines, in many instances parts of Class I roads. In other words, during 1919, and for that matter previous years, the tendency of the country has been towards the wiping out of the smaller lines which proved to have been built in unprofitable locations or under uneconomic conditions. In contrast to this, 1920 indicates a movement towards the tightening up and the weeding out of

THE MILEAGE of the lines upon which operation was abandoned during 1920 greatly exceeds the number of miles of new track built.

The greater part of the mileage abandoned was in the middle and far west.

During the last four years operation has been discontinued on over 1,300 more miles of line than have been built.

Generally speaking, the mileage abandoned in 1920 covered unprofitable lines which never should have been built.

the unnecessary short sections or branches, etc., in order that operating expenses may be kept a minimum.

Another significant point may be noted if the tabulation is studied from a geographical standpoint, i. e., that the greater part of the mileage abandoned lies chiefly in the central west and west, that is, in the states bordering on or lying close to the Mississippi river, from the Gulf to the Lakes and from there west to the Pacific coast. The mileage abandoned in New England and the South Atlantic states was practically negligible—a distinct contrast to the results of 1919 when 255 miles were abandoned in the South Atlantic states and about 28 miles in New England out of a total of 689 miles, the balance of which was scattered generally throughout the country. This factor, in connection with the tendency shown by the marked decrease in the abandonments of entire roads, would seem to indicate that the railway mileage of the United States has about reached the point where future "deflation" will not be so marked or so extreme. This is borne out somewhat by the decrease in the mileage annually abandoned from 1917 to 1919 inclusive; while the figure for 1920 is slightly higher than that for 1919 the fact must not be overlooked that it includes such items as the Illinois Southern, upon which operation will undoubtedly be resumed in the future.

The year 1920 is the fourth one in which our records have shown the mileage abandoned to exceed the mileage of new lines built. Since 1917 there have been 4,032 miles abandoned as against about 2,700 miles of new construction placed in service. Thus there has been a decrease of approximately 1,332 miles in which are included about 225 miles of line abandoned temporarily in 1918 through consolidation under government control as a part of the policy of the Railroad Administration in co-ordinating parallel lines. Some of this mileage no doubt has since been placed in service. Even with that taken into account the figure is distinctive for it shows how markedly the mileage of the railways of the country has decreased, yet it cannot be taken in any sense as an indication of a surplus of mileage for the United States as a whole. It is rather, or at least it would seem to be, a realization of the uneconomic position of various short lines, branches and extensions, and if anything points toward a paving of the way for a more sound and substantial policy for future lines and extensions.

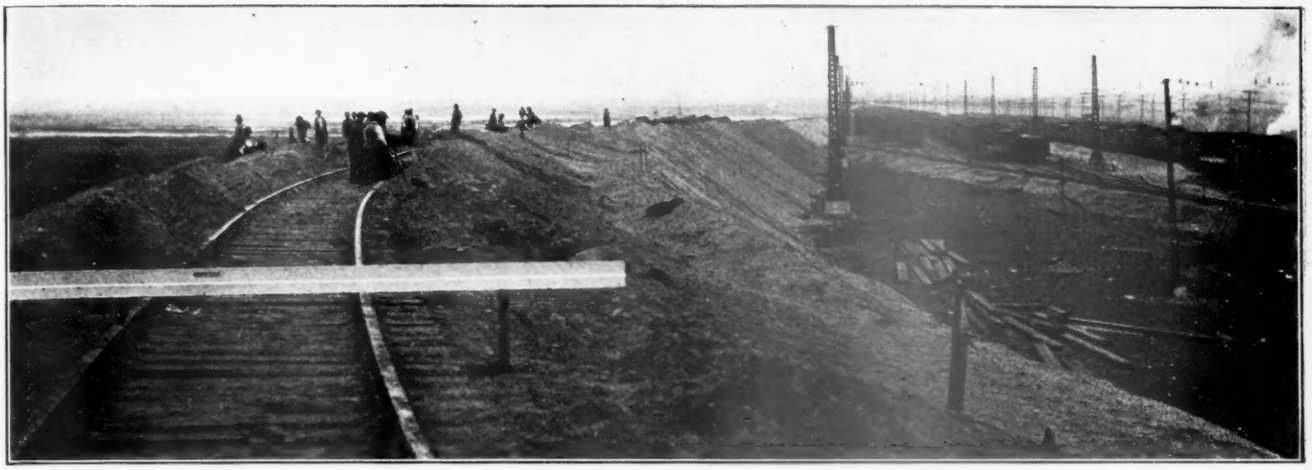
United States	Lines abandoned permanently and taken up. Miles	Lines abandoned and not taken up. Miles
ARKANSAS & LOUISIANA, MISSOURI—		
Rolfe Junction, Ark., to Hamburg	.....	8.80*
*Application made to abandon line.		
ATCHISON, TOPEKA & SANTA FE—COAST LINES—		
Poland Junction, Ariz., to Poland	5.90	.....
BELLEFONTE CENTRAL—		
Pine Grove Mills, Pa., to ½-mile west of Strubles Station	3.00	.....
CENTRAL OF GEORGIA—		
Lyerly, Ga., to Woodyard	4.02	.....
CHICAGO, MILWAUKEE & ST. PAUL—		
Magenta, Wis., to Central Junction	11.15	.....
Coleman, Idaho, to Clagstone Junction	6.15	.....
CHICAGO, ROCK ISLAND & PACIFIC—		
Briark, Ark., to Hopefield	2.07	.....
Watonga, Okla., to Greenfield Junction	6.31	.....
DENVER, BOULDER & WESTERN—		
Boulder to Eldora, Colo	33.00	.....
Sunset to Ward, Colo	13.00	.....
GOVERNMENT RAILROAD IN ALASKA—		
Chena Junction, Alaska, to Chena	5.00	.....
ILLINOIS MIDLAND—		
Millington, Ill., to Newark	.....	2.50
ILLINOIS SOUTHERN—		
Salem, Ill., to Bismarck, Mo	.....	139.65
KENTWOOD & EASTERN—		
Miles post 24 to Kanee, La	1.39	.....
LAKE CHARLES RAILWAY & NAVIGATION CO.—		
Edna, La., to Kinder	7.00	.....
LAWRENCEVILLE BRANCH—		
Lawrenceville, Ga., to Suwanee	10.00	.....
MINCKLER SOUTHERN—		
Sabine to Lumer, Cal	1.00	.....
MISSOURI SOUTHERN—		
Spur line at Dairyville, Mo	5.00	.....
NEAME, CARSON & SOUTHERN—		
Morrison to Galloway, La	4.50	.....
NEWPORT & SHERMAN VALLEY—		
Newport, Pa., to Bloomfield Junction	.....	8.00
NORFOLK & WESTERN—		
Shenandoah Ore branch (Va.)	1.00	.....
Pericoinkla branch (Va.)	1.35	.....
Indian Creek branch (Va.)	0.78	.....
NORTHERN DAKOTA—		
Edinburgh, N. Dak., to Concrete	.....	20.00
OCEAN SHORE RAILROAD—		
San Francisco, Calif., to Tumitas	38.00	.....
Swanton, Calif., to Santa Cruz	15.50	.....
ORANGEBURGH RAILWAY—		
North, S. C., to Orangeburgh	.....	16.80
OUACHITA VALLEY—		
Millville, Ark., to Artesian	.....	28.00
PAJARO VALLEY CONSOLIDATED—		
Near Quarry to Bardin, Calif	1.33	.....
RIVIERA, BEACH & WESTERN—		
Riviera Beach, Tex., to Riviera	.....	9.86
SAN ANTONIO SOUTHERN—		
Macdona, Tex., to Kirk	3.50	.....
SOUTHERN UTAH—		
Provo, Utah to Hiawatha	17.90	.....
SOUTH FLORIDA & GULF—		
Kennensville, Fla., to Bassenger	.....	26.00
SPOKANE & BRITISH COLUMBIA—		
Republic, Wash., to Danville	.....	36.30
UNITED VERDE & PACIFIC—		
Jerome Junction, Ariz., to Jerome	26.26	.....
WEST VIRGINIA MIDLAND—		
Long Run, W. Va., to Parkers	3.50	.....
WILLACOOCHEE & DU PONT—		
Lax, Ga., to Willacoochee	12.00	.....
	239.61	295.91
Canada		
CANADIAN GOVERNMENT—		
Charlotte, Que., to Ste Rosalie	4.51	.....
GREAT NORTHERN—		
Vancouver, Victoria & Eastern	.....	.....
Weston, B. C., to Grandby Smelter	3.74	.....
Copper Junction to Phoenix	25.82	.....
	34.07	.....

LINES ABANDONED IN 1919, BUT RECEIVED TOO LATE FOR INCLUSION IN REPORT FOR THAT YEAR

United States	Lines abandoned permanently and taken up. Miles	Lines abandoned and not taken up. Miles
KANSAS CITY NORTHWESTERN	.....	170.00
NEW BERLIN & WINFIELD	.....	8.00
	.....	178.00

Photo from Keystone View Co., Inc., N. Y.

A Landslide on the Central Railway of Peru



South End of the Cedar Hill Yards of the New Haven

New Construction Conspicuous by Its Absence

Low Record Established for New Mileage Built in 1920—Old Improvements Still Under Way

THE MILEAGE not only of new railway lines, but of additional second and other multiple main tracks built in the United States during the year 1920, took a tremendous though not altogether unexpected slump, reaching a low mark that will in all probability stand as the low record for a long time. During 1920 only 313.71 miles of first track were completed as compared to 685.98 miles in 1919, while the total completed mileages (first, second and other multiple main tracks) for the two years were 414.35 and 1,135.68, respectively; in 1920 it was therefore less than one-half of what in 1919 was considered a very low record for either new lines or completed mileages. The most important decrease, however, or at least the one having the most bearing upon the operating efficiency of the roads was that concerned with the construction of second, third and other main track. For second track this fell from 681.55 miles in 1918 and 405.32 in 1919 to but 90.87 for 1920. Only 1.89 miles of third track were built as compared with 76.95 in 1918 and 27.54 in 1919. The decrease in the construction of other main track was equally as marked.

MILEAGE of new lines in the United States is less than half of that for the previous year, creating a new and exceptionally low mark.

Multiple main track construction practically ceased entirely.

Canadian roads continue to build numerous branches though mileage is still below normal.

Renewal and continuation of unfinished development programs tendency of the year. Work is concerned chiefly with small projects to increase operating capacity.

In Canada there was some decrease in total mileage constructed as compared to the year 1919, but a considerable increase over that for the years 1917 and 1918. During 1920, 305.39 miles of new lines and 31.60 miles of second track were built, or a total of 336.99—but very little less than the mileage of new construction in the United States. While lower than the 442.46 miles of 1919, it indicates a resumption of the policy of expansion which the Canadian roads have been following in tapping and building up new sections of the country. Canada in many ways is yet an undeveloped country and as a result railroad construction has since 1904 followed somewhat along the lines of the development in this country from 1895 to 1907—though, of course, on a smaller scale. Since 1913 construction of new lines both in the United States and Canada has fallen off rapidly, reaching its probable bottom for Canada in 1918. While the 1920 work is below the pre-war average, it does, in connection with that of 1919, mark the resumption of construction activities in Canada.

Of the mileage of new lines built in the United States during the year no one project has been of any great size. The largest single item is that of the Government Railway of Alaska, which completed 37 additional miles—practically the only item at all corresponding to the more or less pioneer work of the old days. Next in size was the mileage completed by the Cisco & Northeastern and the Ringling, Eastern & Gulf, with 28 and 26.6 miles, respectively, the total of the two—54.60 miles—comprising practically the entire mileage of new lines for the state of Texas.

Texas, with 54.90, and California, with 54.74 miles, were the only states with any outstanding new track, comparatively speaking, which is unlike the development of the year previous; in that year sections that showed increases were found to be coal, ore and oil territories. It is therefore not unlikely that the construction of new lines in these two states was a result of the development in the southwestern oil fields, the need for which outweighed other financial considerations, such as high building costs, etc.

It is interesting to note, in comparing the construction of new lines in both the United States and Canada, the various items listed under "Other Important Work Under Construc-

Curves of Mileage Built in the United States and Canada Since 1893

tion." Few new lines of any size are being started or are now under way, these projects being confined chiefly to short extensions or branch lines in the United States, while in Canada there are numerous branch lines underway ranging from 25 up to 135 miles in length and located chiefly in the middle and far west.

While the construction of new lines in this country has been on a gradual decline since 1901, the most marked fall has been since 1913; undoubtedly this was largely due to control, and with an administration unwilling to authorize any new work, yet practically sure of being returned to private ownership. This in connection with the hesitation and delay in ordering material or authorizing new work during the guarantee period after the return to private ownership and financial conditions caused almost a cessation of new work. Second and other multiple track fell to a total of but 100.64 miles, of which over 60 per cent was contained in the two states of Illinois and Ohio; this was

NEW TRACK BUILT IN 1920

		Miles				
UNITED STATES—	No. Cos. building	First track	Second track	Third track	Fourth or more track	Total
Alaska	1	37.00	.....	.....	.....	37.00
Arizona	1	5.00	.....	.....	.....	5.00
Arkansas	2	9.00	.....	.....	.....	9.00
California	5	54.74	.....	.....	.....	54.74
Colorado	1	.....	1.10	.....	.....	1.10
Florida	2	12.20	.....	.....	.....	12.20
Georgia	2	5.00	.....	.....	.....	5.00
Illinois	1	2.00	36.54	.....	.....	38.54
Kansas	1	0.50	.....	.....	.....	0.50
Kentucky	4	19.87	.....	1.80	.....	21.67
Louisiana	3	31.15	.....	.....	.....	31.15
Maryland	1	2.72	.....	.....	.....	2.72
Michigan	1	.....	0.50	.....	.....	0.50
Mississippi	1	9.52	.....	.....	.....	9.52
Missouri	2	0.86	11.85	.....	.....	12.71
New Jersey	2	1.97	2.24	.....	1.74	5.95
New Mexico	1	9.00	.....	.....	.....	9.00
New York	1	1.46	1.46	.....	.....	2.92
Ohio	1	1.35	27.24	0.09	5.99	34.67
Oklahoma	2	18.00	.....	.....	.....	18.00
Oregon	4	8.60	.....	.....	.....	8.60
Pennsylvania	4	6.12	0.39	.....	0.15	6.66
Tennessee	1	2.50	.....	.....	.....	2.50
Texas	3	54.90	1.70	.....	.....	56.60
Utah	1	3.60	.....	.....	.....	3.60
Virginia	1	0.20	.....	.....	.....	0.20
West Virginia	3	16.45	1.75	.....	.....	18.20
Wisconsin	1	.....	6.10	.....	.....	6.10
Total	53	313.71	90.87	1.89	7.88	414.35
CANADA	7	305.39	31.60	.....	.....	336.99

NEW TRACK BUILT IN 1919

		Miles				
UNITED STATES—	No. Cos. building	First track	Second track	Third track	Fourth or more track	Total
Alabama	2	11.50	29.70	.....	.....	41.20
Arizona	4	32.40	3.13	.....	.....	35.53
Arkansas	1	2.00	.....	.....	.....	2.00
California	2	69.29	.....	.....	.....	69.29
Colorado	1	.....	20.00	.....	.....	20.00
Delaware	1	.....	8.00	.....	.....	8.00
Florida	1	17.60	.....	.....	.....	17.60
Georgia	2	14.00	12.64	.....	.....	26.64
Idaho	1	4.00	.....	.....	.....	4.00
Illinois	1	6.50	7.81	.....	.....	14.31
Indiana	1	.....	9.00	.....	.....	9.00
Iowa	1	.75	.....	.....	.....	.75
Kansas	2	35.34	48.97	5.64	.....	89.95
Kentucky	4	48.94	30.55	.....	.....	79.49
Louisiana	1	.39	.....	.....	.....	.39
Maine	1	.50	.....	.....	.....	.50
Maryland	1	.75	.....	.....	.....	.75
Mississippi	3	62.50	.....	.....	.....	62.50
Nevada	1	2.26	.....	.....	.....	2.26
New Jersey	2	2.62	.....	21.90	13.40	37.92
North Carolina	1	.....	41.00	.....	.....	41.00
Ohio	1	4.08	.....	.....	3.44	7.52
Oklahoma	4	91.60	7.05	.....	.....	98.65
Oregon	3	51.90	.....	.....	.....	51.90
Pennsylvania	2	36.68	6.98	.....	.....	43.66
South Carolina	1	.....	86.35	.....	.....	86.35
Tennessee	2	23.50	23.36	.....	.....	46.86
Texas	3	86.00	10.50	.....	.....	96.50
Utah	1	10.50	15.82	.....	.....	26.32
Virginia	1	42.00	.....	.....	.....	42.00
West Virginia	2	24.00	.....	.....	.....	24.00
Wyoming	1	4.38	44.46	.....	.....	48.84
Totals	54	685.98	405.32	27.54	16.84	1,135.68
CANADA	6	433.31	9.15	.....	.....	442.46

the world war, at least up to and including 1918. From the time when the Railroad Administration policies began to be put in action, the development tended more toward intensive development rather than extensive. As a result of this, second and other multiple track were built, even though new lines were not being constructed.

With the advent of the year 1920, the roads found themselves in an uncertain condition—still under government

built chiefly in short sections by the Illinois Central and the Cleveland, Cincinnati, Chicago & St. Louis. The maximum length of any one section of double track work was 13 miles.

In general, construction work has been limited to such facilities as were absolutely needed to conduct operation. Practically no new work of any magnitude was inaugurated with perhaps a few exceptions of which the Claremont rail

and deep water terminal of the Lehigh Valley at the Port of New York is probably the largest. Considerable work involving heavy expenditures was underway or completed during 1920, but it consisted of large projects started before government control on which progress had been curtailed and on which the work was authorized to be continued or work which was started under federal control. Typical examples of this class include such projects as the New Haven terminal program covering Boston, Cedar Hill and Providence, and the Chicago freight terminal of the Chicago & Alton.

The larger part of the work has, however, been restricted to the most needed improvements which would effect temporary increases in the facilities for handling the greatly increased traffic of the year rather than any extensive work designed to bring about future operating economies. This is indicated by the number of small improvements varying from $100,000 to $200,000 in cost and covering such work as additions to engine houses, yards, freight house extensions, etc.

As to bridges, little was done outside of making needed repairs and strengthening existing structures for the use of heavier power. Under new construction such structures as the Allegheny river bridge of the Baltimore & Ohio and the Harrisburg bridge of the Philadelphia & Reading. Grade separation has likewise suffered and outside of some carried over projects practically nothing has been done. Grade reductions, passenger terminal work, etc., have also suffered in much the same manner and with the exception of the St. Paul (Minn.) station, new passenger terminal work of any magnitude has been at a standstill, though such projects as the Indianapolis (Ind.) work still under way and the Union station improvements at Chicago, now in progress must be considered in passing.

As a whole, the work underway or completed during 1920, when considered from the viewpoint of the decreased value of the dollar during that period, has been the smallest for a great number of years and its effect so far as bringing about any immediate or future operating economies has been even less. With the passing of the war and its accompanying government control, the roads have been left in a sadly depleted condition. What the year 1921 will bring in the way of actual new construction is still an open question; the outcome and the corresponding volume of work will depend upon future financial considerations all hinging largely on the results of the new rates. There is no question but that there is a great need for a widespread and extensive program of construction, and since in all probability the rates will prove ample there should, and no doubt will be, a far larger construction program inaugurated during 1921 than the country has seen for the past three or four years.

MILES OF NEW LINE COMPLETED IN THE UNITED STATES SINCE 1894

1895	1,430	1908	3,214
1896	1,692	1909	3,748
1897	2,109	1910	4,122
1898	3,265	1911	3,066
1899	4,569	1912	2,997
1900	4,894	1913	3,071
1901	5,368	1914	1,532
1902	6,026	1915	933
1903	5,652	1916	1,098
1904	3,832	1917	979
1905	4,388	1918	721
1906	5,623	1919	686
1907	5,212	1920	314

Railroad Construction in the United States in 1920

Alton & Southern

First Track: Madison, Ill., to Illinois Traction Crossing, 2 miles.

Americus & Atlantic

First Track: Flint River, Ga., to Methvins, 3 miles.
Other Important Work Under Construction: Building from Methvins, Ga., to Americus, 11 miles, railway forces doing the work.

Arizona Eastern

First Track: Avondale, Ariz., to Litchfield, 5 miles.

Atchison, Topeka & Santa Fe

First Track: Oil Junction, Cal., to Landco, 2.82 miles.
Second Track: On Western lines.—At La Junta, Colo., 1.10 miles.
Other Important Work Under Construction: On Eastern lines.—Subway extension at Emporia, Kans., cost $200,947, completed; bridge renewal between Akron, O., and Winfield, cost $134,454, 25 per cent completed; viaduct at Argentine, Kans., cost $188,241, 50 per cent completed; reinforced concrete dock, at Chicago, Ill., cost $161,189, completed. On Western lines.—Machine shop at Albuquerque, N. M., cost $1,409,557, 30 per cent completed. On Coast Lines.—Improvements to bridge 194-A on Albuquerque division, cost $197,954, completed. On Panhandle, Santa Fe.—Addition to roundhouse, Amarillo, Tex., cost $138,827, 10 per cent completed.

Atlantic Coast Line

Other Important Work Under Construction: Building from Goodno, Fla., to Imokalee, 26 miles, company's forces doing the work; yard improvements at South Rocky Mountain, N. C., cost $114,000, 80 per cent completed.

Baltimore & Ohio

Other Important Work Under Construction: Renewal of roof at west end of Fairmount Park tunnel, Philadelphia, Pa., cost $275,000, 50 per cent completed; purchase and remodeling office building Baltimore, Md., cost $777,000, completed; revision of Locust Point branch and reconstruction of yard in connection with construction of an industrial plant, cost $795,000, 40 per cent completed; installation of trimmers on coal pier, Curtis Bay, Md., cost $138,000, completed; elimination of grade crossing at Claysville, Pa., cost $153,000, completed; reconstruction of bridge over Allegheny river, Pittsburgh, Pa., cost $2,110,000, 80 per cent completed; installation of 80 foot turntable, Allegheny, Pa., cost $100,000, completed; relocation of main line and reconstruction of yard in connection with enlargement of an industrial plant at Girard, Ohio, cost $336,000, 95 per cent completed; construction of concrete arch and filling of old bridge, Painesville, Ohio, cost $102,000, completed; enlargement of engine house, South Chicago, Ill., cost $176,300, completed.

Baltimore & Ohio Chicago Terminal

Other Important Work Under Construction: Track elevation 68th street and 39th street, Chicago, cost $2,000,000, 25 per cent completed.

Baltimore & Ohio South Western

Other Important Work Under Construction: Reconstruction of bridge over Big Miami river, Lawrenceburg, Ind., cost $1,980,000, 15 per cent completed.

Big Sandy & Kentucky River

First Track: From near Riceville, Ky., to Sublett, 8 miles.
Other Important Work Under Construction: Building from near Sublett, Ky., to the mouth of Laurel Fork of Oakley Creek in Magoffin county, 4 miles. Contractors: Howard Brothers, Sublett, Ky.

Boston & Albany

Other Important Work Under Construction: Renewal of bridge at Westfield, Mass., cost $250,000, completed; reconstruction of drawbridge at Chelsea, Mass., cost $280,000, completed.

California Southern

First Track: Blythe, Cal., to Ripley, 8 miles.

Central New England

Other Important Work Under Construction: Coal and water station at Hopewell Junction, N. Y., cost $112,650, 98 per cent completed.

Central of Georgia

Other Important Work Under Construction: Reinforcing concrete roundhouse at Columbus, Ga., cost $506,000, 3 per cent completed; freight station at Macon, Ga., cost $163,000, completed.

Central of New Jersey

Other Important Work Under Construction: Renewal of bridge 214, East Rahway, N. J., cost $222,000, 25 per cent completed; bridge 217, Maurer, N. J., cost $375,000, 7 per cent completed.

Chartiers Southern Railway

First Track: Crucible, Pa., to Nemacolin, 5.35 miles.

Chesapeake & Ohio

First Track: Man to Gilbert (W. Va.) line, 7.20 miles.
Second Track: Logan to Stollings, W. Va., 1.75 miles.
Third Track: Big Sandy Junction, Ky., to Russell, 1.80 miles.

Chicago & Alton

Second Track: Nilwood, Ill., to Bierd, 4.37 miles.
Other Important Work Under Construction: Freight terminal, Chicago, Ill., cost $2,600,000, 50 per cent completed.

Chicago & North Western

Other Important Work Under Construction: Bridge construction at Maywood, Ill., cost $140,000, completed; steel and concrete viaduct at Orleans St., Chicago, cost $800,000, completed; additional storage bins at

Calumet Terminal elevator, South Chicago, cost $800,000, completed; bridge construction at Lick, Ill., cost $130,000, 75 per cent completed; passenger station facilities at Clinton, Iowa, cost $260,000, completed; bridge construction at Mankato, Minn., cost $125,000, completed.

Chicago, Burlington & Quincy

Second Track: Ayres, Ill., to Durley, 5.17 miles.

Other Important Work Under Construction: Elevation and realinement of main tracks, Aurora, Ill., cost $5,000,000, 75 per cent completed; freight transfer facilities at Morton Park, Ill., cost $228,000, completed; new engine terminal facilities, Galesburg, Ill., cost $300,000, completed; new engine terminal at Pacific Junction, Iowa, cost $100,000, completed; grain elevator at Murray, Mo., cost $450,000, completed.

Chicago, Indianapolis & Louisville

Other Important Work Under Construction: Brick car repair shop, LaFayette, Ind., cost $175,000, to be completed by March, 1921.

Chicago, Milwaukee & St. Paul

Other Important Work Under Construction: Extension to yard at Aberdeen, S. Dak., cost $325,000, completed; new yard at Mitchell, S. Dak., cost $175,000, completed; water supply and treating plants in South Dakota, cost $300,000, 75 per cent completed.

Chicago, Rock Island & Pacific

Other Important Work Under Construction: Office building, Chicago, cost $100,000, 75 per cent completed.

Chicago, St. Paul, Minneapolis & Omaha

Other Important Work Under Construction: Freight house facilities at Sioux Falls, S. Dak., cost $111,396, 50 per cent completed.

Chicago Union Station

Other Important Work Under Construction: Station facilities, Chicago, Ill., from Roosevelt Road on the south to Canal and Kinzie street on the north, Canal street on the west to Chicago river on the east; work expected to be completed in 1923.

Cisco & Northeastern

First Track: Cisco, Tex., to Breckenridge, 28 miles.

Cleveland, Cincinnati, Chicago & St. Louis

Second Track: Lamb, Ohio, to Ansonia, 17 miles.

Other Important Work Under Construction: Yard extension at Mattoon, Ill., cost $115,000, 55 per cent completed; new freight house at Muncie, Ind., cost $135,000, 90 per cent completed; second track and relocation work, Augusta, Ind., to Whitestown, grading and bridges, completed, cost $1,160,000, 60 per cent completed.

Cornwall Railroad

Other Important Work Under Construction: Locomotive erecting and machine shop at Lebanon, Pa., also boiler house, cost $140,000; 40 per cent completed.

Delaware & Hudson

Other Important Work Under Construction: New third track, Schenevus, N. Y., to Richmondville Summit, 12.60 miles, including reduction of grade on north bound traffic, cost $1,000,000, 70 per cent completed.

Delaware, Lackawanna & Western

Other Important Work Under Construction: Grade crossing elimination, Sanford's Crossing, Kearney, N. J., cost $305,000, 85 per cent completed; engine terminal improvements, Port Morris, N. J., cost $182,000, 70 per cent completed; engine terminal improvements at Secaucus, N. J., cost $179,000, 60 per cent completed; new powerhouse, Hoboken, N. J., cost $139,000, 40 per cent completed; additions to passenger station, Scranton, Pa., cost $195,367, 30 per cent completed; elimination of grade crossing, Elmhurst, Pa., cost $112,178, completed; renewal of bridge at mile post 293.56, Avoca, N. Y., cost $111,817, completed.

Donora Southern

Other Important Work Under Construction: New yard and additional trackage at Donora, Pa., joint operation with the Pennsylvania Railroad, cost $130,000, 16 per cent completed. Work held up pending action of Pennsylvania Railroad.

East Erie Commercial Railroad

Other Important Work Under Construction: Grade separation at Water street in Wesleyville, Pa., cost $235,000, 25 per cent completed.

Erie Railroad

Other Important Work Under Construction: Renewal of draw-bridge over Passaic river, Newark, N. J., cost $600,000, 40 per cent completed; construction of fruit market and track facilities, Newark, N. J., cost $122,000, completed.

Fernwood, Columbia & Gulf

First Track: Kokomo, Miss., to Foxworth, 9.52 miles.

Florida East Coast

Other Important Work Under Construction: Freight house at Miami, Fla., cost $125,000, 50 per cent completed.

Fort Worth & Denver City

Second Track: At Wichita Falls, Tex., 1 mile.

Other Important Work Under Construction: Freight yard at Fort Worth, Tex., cost $140,000, 20 per cent completed.

Fort Worth & Rio Grande

Other Important Work Under Construction: New terminal, including new yard and mechanical facilities, at Dublin, Tex., cost $250,000, track, 75 per cent completed, mechanical facilities, 25 per cent completed.

Government Railroad in Alaska

First Track: Mile post 238 to mile post 275, 37 miles.

Other Important Work Under Construction: Building from mile post 275 to mile post 358, 81 miles; reconstruction of bridges and trestles between Seward, and Anchorage, cost $252,400, completed; 1,559 lineal ft. of snow sheds between Seward, and Anchorage, cost $195,700, completed; raising track, etc., between Seward, and mile post 238, cost $223,500, completed.

Grand Prairie Branch Railroad

First Track: In Arkansas, not specified, 1 mile.

Great Northern

Other Important Work Under Construction: Twelve mechanical coal chutes, 10 of which are at Spokane, Wash., cost $306,410, 90 per cent completed; additional yard tracks at Hillyard, Wash., cost $315,185, and at Allouez, Wis., cost $115,000, both completed; open dock at Smith's Cove, Seattle, Wash., cost $161,000, completed; rebuilding part of ore dock No. 3 and approach to ore dock No. 1 at Allouez, Wis., cost $1,558,000, to be completed by May, 1921; machine shop extension at Whitefish, Mont., cost $117,720, completed; car repair sheds at Williston, N. Dak., cost $112,300, completed, and at Grand Forks, N. Dak., cost $103,300, completed; bridge at Como and 10th avenue, Minneapolis, Minn., cost $160,400, 2 per cent completed; filling in two bridges in North Dakota, one to cost $131,940, and the other $110,200, completed; lining tunnel on Billings line, cost $109,650, completed.

Gulf, Colorado & Santa Fe

Other Important Work Under Construction: Reconstruction of causeway at Galveston, Tex., work started in 1917, cost $307,839, 83 per cent completed.

Hocking Valley

Second Track: Meredith, Ohio, to Owens, 9 miles.

Other Important Work Under Construction: Scioto River Channel improvement includes two additional spans to each of two bridges at Columbus, Ohio, cost $200,000, completed.

Illinois Central

Second Track: Clinton, Ill., to Heyworth, 8.40 miles; Amboy, Ill., to Sublett, 5.60 miles; Peotone, Ill., to Tucker, 13 miles.

Other Important Work Under Construction: Yard extension, Freeport, Ill., cost $137,000, completed; new passenger and freight station at Centralia, Ill., cost $298,870, completed; new bridge at Dixon, Ill., cost $268,210, completed.

Indianapolis Union Railway

Other Important Work Under Construction: Elevation of train shed and tracks in Indianapolis, Ind., cost $8,000,000, 80 per cent completed.

Kanawah, Glen Jean & Eastern

First Track: Mt. Hope, W. Va., to Lee, 1.25 miles.

Kansas & Oklahoma

First Track: At Liberal, Kan., 0.50 miles.

Other Important Work Under Construction: Building from Forgan, Okla., to Liberal, Kan., 25 miles, contractors: Strickland & Smedley, Forgan, Okla.

Kansas City Terminal

Other Important Work Under Construction: Holmes street viaduct, Kansas City, Mo., cost $245,000, 56 per cent completed; Fifteenth street subway, Kansas City, Mo., cost $447,000, 78 per cent completed; passenger station, Seventh street, Kansas City, Kan., cost $145,000, 10 per cent completed.

Kentucky & Tennessee

First Track: In Kentucky, not specified, 1 mile.

Other Important Work Under Construction: Building in Kentucky from mile post 17.5 to mile post 27, 9.50 miles.

Lake Erie & Eastern

First Track: Brier Hill (Youngstown, O.) to M. Y. Tower, 1.35 miles.

Second Track: Brier Hill (Youngstown, O.) to M. Y. Tower, 1.24 miles.

Other Important Work Under Construction: Raising South avenue bridge, changing streets, etc., Youngstown, O., cost $400,000, completed.

Leesville, Slagle & Eastern

First Track: Slagle, La., to Leesville, 10.35 miles.

Lehigh Valley

First Track: In New Jersey at end of Raritan branch, 0.31 miles; from connection with main line at Bayonne, N. J., to end of branch 1.11 miles; at North Wilkes-Barre, Pa., 0.07 miles.

Other Important Work Under Construction: Construction of first unit of a new rail and deep water terminal, Jersey City, N. J., 25 per cent completed; new engine terminal at Ashmore, Pa., completed.

Live Oak Perry & Gulf

First Track: In Florida from mile post 65 to mile post 68½, 3.50 miles.

Other Important Work Under Construction: Building in Florida from mile post 68½ to mile post 72½, 4 miles. J. C. Donohow, Jacksonville, Fla., has contract for grading, and company's force will construct bridges and lay tracks.

Long Fork

First Track: From Clear Creek, Ky., to coal mine, 4 miles.

Other Important Work Under Construction: Building from Jack's Creek, Ky., to Coal Mine, 1.65 miles; contractors Blue River Elkhorn Fuel Company.

Louisville & Nashville

First Track: Hamdin, Ky., to Yellow Creek, 6.87 miles.
Other Important Work Under Construction: Mechanical coaling plant, Corbin, Ky., cost $125,000, 50 per cent completed; yard and mechanical facilities, Loyall, Ky., cost $600,000, 10 per cent completed; mechanical facilities, Hazard, Ky., cost $480,000, 5 per cent completed.

Manufacturers Railway

First Track: At St. Louis, Mo., 0.36 miles.
Second Track: At St. Louis, Mo., 0.65 miles.

Michigan Central

Second Track: In Michigan from Detroit Belt Line, 0.50 miles.
Other Important Work Under Construction: Reconstructing bridge over River Rouge at Detroit, Mich., joint expense of Michigan Central and New York Central, cost $500,000, 95 per cent completed; grade separation, Detroit, Mich., to River Rouge, joint expense Michigan Central, New York Central, Wabash, and Pere Marquette, cost $1,500,000, 20 per cent completed.

Minckler Southern

First Track: Porterville Cal., to Ducor, 12.07 miles.

Minneapolis, St. Paul & Sault Ste. Marie

Second Track: At Neenah, Wis., 2.60 miles; at Waukesha, 3.10 miles; at Stevens Point, 0.40 miles.

Minnesota Transfer

Other Important Work Under Construction: Grade separation work at Minneapolis, Minn., cost $100,000, 75 per cent completed.

Missouri Pacific

Other Important Work Under Construction: New terminal facilities at Gale, Ill., cost $135,900, completed; raising main tracks over levees and drainage ditches, between Poplar Bluff, Mo., and Fisk, cost $224,500, 60 per cent, completed; reconstruction and enlargement of passenger station at Little Rock, Ark., cost $690,000, 80 per cent completed.

Mobile & Ohio

Other Important Work Under Construction: Freight house facilities at East St. Louis, Ill., cost $150,000, 30 per cent completed.

Neame, Carson & Southern

First Track: Staples Junction, La., northwest 8.80 miles.

Newburgh & South Shore

Other Important Work Under Construction: At Cleveland, Ohio, car shop, cost $265,000, 60 per cent completed.

New York Central

Other Important Work Under Construction: Freight office at Weehawken, N. J., cost $200,000, 75 per cent completed; coaling pit, ash pit and sand house at Rensselaer, N. Y., cost $365,000, 75 per cent completed; eliminating grade crossing, Brown street, Rochester, N. Y., cost $650,000, 5 per cent completed; subway under tracks at Harbor Creek, Pa., cost $110,000, 25 per cent completed; subway at Wesleyville, Pa., cost $229,285, 35 per cent completed; subway at Erie, Pa., cost $188,985, completed; viaduct and relocation of freight house at Youngstown, O., cost $310,285, 85 per cent completed; cinder pit and yard tracks at Collinwood, O., cost $110,000, 25 per cent completed; raising tracks and separation of grades, Elyria, O., cost $354,595, 30 per cent completed; stock facilities and new track at Rockport, O., cost $455,000, 70 per cent completed; raising tracks and constructing subway, Detroit, Mich., cost $104,445, 5 per cent completed; renewal of River Rouge drawbridge, Detroit, Mich., cost $270,500, 95 per cent completed.

New York, New Haven & Hartford

Other Important Work Under Construction: Extension to Cedar Hill (Conn.) shop, cost $377,080, 34 per cent completed; transfer platform at Cedar Hill, cost $470,300, completed; improvements at South Bay Coach yard, near South Boston (Mass.) passenger terminal, cost $225,700, 30 per cent completed; additional tracks, bridge and culvert work, Kingston-Wickford, cost $165,000, 16 per cent completed; westbound tracks from Bradford to Westerley, R. I., cost $120,000, 75 per cent completed; pipe flume at power house, Cos Cob, Conn., cost $100,000, 65 per cent completed; engine facilities and tracks at State Line, Mass., cost $137,000, completed; extension of branch switch yard, Hartford, Conn., cost $294,000, 21 per cent completed, work has been deferred.

New York, Westchester & Boston

First Track: New Rochelle, N. Y., to Chatsworth avenue, Larchmont, 1.46 miles.
Second Track: New Rochelle, N. Y., to Chatsworth avenue, Larchmont, 1.46 miles.

Norfolk & Western

First Track: In Virginia, from Lewis Creek, branch extension, 0.20 miles,
Other Important Work Under Construction: New 120-ton capacity dumper and electrification of piers 2 and 3 at Norfolk, Va., cost $650,000, 30 per cent completed; trimming machine on pier 4, Norfolk, cost $150,000, to be installed; additional yard tracks and rearrangement of tracks at Norfolk, cost $210,000, 30 per cent completed; new water supply facilities at Roanoke, Va., cost $223,000, 75 per cent completed; additional engine terminal facilities at Roanoke, Va., cost $1,000,000, 75 per cent completed; tie-treating plant at Radford, Va., cost $500,000, 50 per cent completed; additional yard tracks and engine facilities at Bristol, Va., cost $1,300,000, 80 per cent completed; passing track extensions between Bluefield, W. Va., and Norton, cost $150,000, 75 per cent completed; coal branch, Pigeon Creek, Rockhouse Fork, from Lenore, W. Va., under construction 18 miles, cost $2,000,000, 60 per cent completed; bridge to carry freight house spur from Pennsylvania tracks at Cleveland avenue, Columbus, Ohio, cost $140,000, 90 per cent completed.

Northern Pacific

Other Important Work Under Construction: Grade separation at Minneapolis, Minn., cost $350,000, 75 per cent completed; grade separation at Fargo, N. Dak., cost $196,000, 90 per cent completed.

Oregon, California & Eastern

First Track: Between Klamath Falls, Ore., and Dairy, 1.50 miles.
Other Important Work Under Construction: Building from Dairy, Ore., to Sprague river, 20 miles, company's forces doing the work.

Oklahoma-Southwestern

First Track: Between Bristow, Okla., and Slick, 13 miles.
Other Important Work Under Construction: Building between Slick and Bristow, 37 miles; contractors, Allhands & Davis Construction Company, Bristow, Okla., 20 per cent completed.

Oneida & Western

First Track: From Stockton, Tenn., northwest 2.50 miles.

Patapsco & Back River

First Track: At Sparrow's Point, Md., 2.72 miles.

Pennsylvania System

First Track: Eastern region.—Hegerman street branch, Philadelphia, Pa., 0.18 miles. On the P. B. & W.—At Chester, Pa., 0.39 miles.
Second Track: On the P. B. & W.—At Chester, Pa., 0.19 miles.
Third Track: Central region.—West of Alliance, Ohio, 0.09 miles.
Fourth Track: Central region.—West of Alliance, Ohio, 0.09 miles; Maximo, Ohio, to Fairhope, 5.90 miles
Other Important Work Under Construction: Central region.—Relocation of bridge over Clarion river at Parkers Landing, Pa., cost $600,000, completed; classification yard at Dennison, Ohio, cost $2,600,000, 42 per cent completed; engine house facilities, Mingo Junction, Ohio, cost $1,503,000, 90 per cent completed; engine yard facilities, Mingo Junction, cost $596,000, 98 per cent completed; classification and industrial yard at Mingo Junction, cost $6,612,000, 33 per cent completed; engine house and shop, Canton, Ohio, cost $5,270,000, 95 per cent completed; new engine terminal and shop facilities, Scully yard, Pittsburgh, Pa., cost $3,400,000, 65 per cent completed; additional tracks and yard facilities; Kinsman street yard, Cleveland, Ohio, cost $244,500, completed; track elevation and grade crossing elimination, from Cedar avenue to Holton street, Cleveland, Ohio, cost $2,780,000, to be completed in 1922; engine house improvements, Wellsville (Ohio) shop, cost $1,250,000, completed; reconstructing bridge No. 122, Rochester, Pa., cost $650,400, completed; West street engine terminal improvements, Ashtabula, Ohio, cost $181,455, completed; low grade freight line, Kenwood, Pa., to Rochester, cost $4,425,000, 60 per cent completed; new main tracks, yard and engine terminal, Briar Hill to Girard, Ohio, cost $6,200,000, 25 per cent completed; engine terminal facilities at Wheatland, Pa.; cost $600,000, completed; relocation of double track line, Summitvile, Ohio, to "KN" tower, 7 miles, cost $2,500,000, 78 per cent complete; at Yellow Creek, Ohio, "Y" tracks and second track to Hammondsville, cost $1,381,000, to be finished in 1921; new engine terminal facilities at Mahoningtown, Pa., cost $2,268,000, 30 per cent completed. Southwestern region.—New erecting shop at Columbus, Ohio, cost $450,000, 40 per cent completed; passenger engine terminal, Spruce street, Columbus, cost $2,500,000, 56 per cent completed; extension of westward classification yard, Columbus, cost $1,500,000, 90 per cent completed; extension of bridge No. 3 over Scioto river, Columbus, cost $250,000, 90 per cent completed; engine terminal improvements, Richmond, Ind., cost $1,500,000, completed; track elevation at Indianapolis, Ind., cost $200,000, 90 per cent completed.

Pere Marquette

Other Important Work Under Construction: New engine terminal, yard, etc.; New Buffalo, Mich., cost $750,000, 80 per cent completed; building new engine terminals, Saginaw, Mich., cost $980,000, 50 per cent completed; new engine terminal, Plymouth, Mich., cost $450,000, 60 per cent completed; Thornapple river bridge, McCords, Mich., cost $150,000, 30 per cent completed.

Philadelphia & Reading

First Track: Between Belle Mead, N. J., and Manville, 0.55 miles; in Pennsylvania, not specified, 0.13 miles.
Second Track: Between Belle Mead, N. J., and Manville, 0.60 miles; in Pennsylvania, not specified, 0.20 miles.
Fourth Track: Between Glenmore, N. J., and Hopewell, 1.74 miles; in Pennsylvania, not specified, 0.15 miles.
Other Important Work Under Construction: New county bridge over tracks on line of Fayette street, Conshohocken, Pa., part of cost to be paid by the Philadelphia & Reading, work 40 per cent completed; replacing bridge No. 8 over Susquehanna river, west of Harrisburg, Pa., 22.5 per cent completed; replacing bridge No. 7 north of McAuley, Pa., 53 per cent completed; rebuilding bridge over Oley street, Reading, Pa., 80 per cent completed; elimination of bridges No. 2 and No. 3 north of Molino, Pa., and bridge No. 4 south of Millers, contract let but no physical work done to date; opening Tulip street, Philadelphia, Pa., under tracks of Richmond branch between Somerset street and Lehigh avenue, 45.7 per cent completed, between Somerset street and Lehigh avenue, 38.5 per cent completed; coaling station and sand house Tulip street engine yard, Philadelphia, 56.5 per cent completed; rebuilding Columbia bridge over Schuylkill river, Schuylkill canal and Fairmont Park, Philadelphia, 80 per cent completed; ash pit, inspection pit, water supply and fire protection, Tulip street engine yard, Philadelphia, 24.5 per cent completed.

Pittsburgh & Lake Erie

Other Important Work Under Construction: Enlargement of yard at Hazelton, Ohio, cost $175,000, completed.

Pittsburgh, Chartiers & Youghiogheny

Other Important Work Under Construction: Building from Van Emman, Pa., to Eighty-four, Pa., 8.36 miles.

Portland, Astoria & Pacific

First Track: Wilkesboro to Manning, Ore., 4 miles.
Other Important Work Under Construction: Building from Manning, Ore., to Keasey, 28 miles; contractors, Utah Construction Company, Portland, Ore.

Raritan River

Second Track: At South Amboy, N. J., 0.52 miles; Gillespie, N. J., to South River, 1.12 miles.

Ringling, Eastland & Gulf

First Track: Mangum, Tex., to Breckwalker, 26.60 miles.

Rio Grande & Southwestern

First Track: In New Mexico, not specified, 9 miles.

St. Louis, Kennett & South Eastern

First Track: In Missouri, between Kennett, Mo., and Deering, 0.50 miles.
Other Important Work Under Construction: Building extension from Kennett, Mo., 9 miles, cost $175,000, 5 per cent completed.

St. Louis-San Francsico

Second Track: Eureka, Mo., to Pacific, 6.90 miles; Globe, Mo., to Monett, 4.30 miles.
Other Important Work Under Construction: Engine terminal facilities at Afton, Okla., cost $102,626, 80 per cent completed, at Lawton, Okla., cost $127,913, 10 per cent completed and at Monett, Mo., cost $152,319, completed. On the St. Louis-San Francisco & Texas.—Engine terminal facilities at Sherman, Tex., cost $130,875, 80 per cent completed.

St. Louis Southwestern of Texas

Other Important Work Under Construction: Terminal facilities at Hodge, Tex., cost $105,500, completed.

St. Paul Bridge & Terminal

Other Important Work Under Construction: New storage yard at South St. Paul, Minn., cost $132,642, 30 per cent completed.

St. Paul Union Depot

Other Important Work Under Construction: New passenger station, St. Paul, Minn., cost $11,000,000, 30 per cent completed.

Sewell Valley

Other Important Work Under Construction: Building from Rainelle Junction, W. Va., to Glencoe, 12 miles; contractors, Meadow River Lumber Co., Rainelle, W. Va.

Southern Pacific

First Track: From near Knights Landing, Cal., to Sheffield, 16.49 miles; Marchant, Cal., to Karnak, 2.75 miles. In Texas: Mile Post 2.8 to Mile Post 3.1, Dallas Belt (H. & T. C.), 0.30 miles.
Second Track: On the Galveston, Harrisburg & San Antonio. At El Paso, Tex., 0.70 miles.
Other Important Work Under Construction: New construction work to eliminate two tunnels between Marcell, Cal., and Cable, cost $149,090, 25 per cent completed; engine house facilities, Mojava, Cal., cost $140,304, completed; engine house facilities at Indio, Cal., cost $101,305, completed. On Central Pacific: New steel foundry at Sacramento, Cal., cost $126,328, completed. On the Southern Pacific lines in Texas and Louisiana.—Additional tracks, Houston-Englewood yards, cost $245,000, 50 per cent completed; renewing bridge span over Neches river, cost $118,060, 10 per cent completed; renewing bridge span over Trinity river, cost $101,241, 10 per cent completed.

Southern Railway & Navigation Company

First Track: In Louisiana, not specified, 12 miles.

Staten Island Rapid Transit

Other Important Work Under Construction: Reconstruction of thawing shed, Arlington, S. I., N. Y., cost $342,000, completed.

Tampa Southern

First Track: In Florida, not specified, 8.70 miles.
Other Important Work Under Construction: Building from Seth, Fla., to Palmetto, 8.80 miles; contractors, E. G. Stoney, Sarasota, Fla.; H. E. Springstead, Palmetto, Fla.; John F. Lamb, Thomasville, Ga.

Terminal Railroad Association of St. Louis

Other Important Work Under Construction: Enlargement of shop, at Brooklyn, Ill., cost $510,000, completed; reconstruction of highway deck of west approach of Eads Bridge, St. Louis, Mo., cost $160,000, 55 per cent completed.

Texas City Terminal Company

Other Important Work Under Construction: Oil dock at Texas City, Tex., cost $90,000, and dredging turning basin at Texas City, cost $75,000, completed.

Texas, Oklahoma & Eastern

First Track: In Oklahoma, Mile Post 36 to Mile Post 41, 5 miles; from Oklahoma-Arkansas state line to DeQueen, Ark, 8 miles.

Toledo & Cincinnati

Other Important Work Under Construction: Construction of roadbed for second track in connection with relocation of main line by Miami Conservancy District Commission, North Dayton to Tippecanoe, Ohio, cost $475,000, completed.

Union Pacific

Other Important Work Under Construction: Installing concrete lining and extending concrete portals at end of Hermosa tunnel (Old Sherman tunnel), Hermosa, Wyo., cost $372,500, 34 per cent completed, work suspended for winter; will be resumed in spring; additional yard tracks at Green River, Wyo., cost $139,000, 84 per cent completed; lining 1,830 feet long of Sherman tunnel with concrete, Hermosa, Wyo., cost $323,000, 35 per cent completed; concrete viaduct at Central avenue, Kansas city, Kan., cost $203,980, completed. Union Pacific Coal Company spur, building from Lionkol, Wyo., to about 1 mile west, 1.20 miles; contractor, Utah Construction Company, Ogden, Utah. Oregon Short Line building from Strachan to Phosphate Mine, Idaho, 7.54 miles; contractors, Utah Construction Company, Ogden, Utah. Oregon-Washington Railroad & Navigation Company. Engine division improvements; at Huntington, Ore., cost $168,670, 95 per cent completed, and at Rieth, Ore., cost $175,250, 75 per cent completed; terminal improvements at Albina (Ore.) yards, cost $168,022, 50 per cent completed.

Utah Railway

Other Important Work Under Construction: Machine shop at Provo, Utah, cost $200,000, 30 per cent completed.

Utah Terminal

First Track: Utah Railway Junction, Utah, to coal mines in Spring Canyon, 3.60 miles.

Uvalde & Northern

Other Important Work Under Construction: Building from Uvalde, Tex., to Camp Wood, 40 miles; contractors: L. J. Smith Construction Company, Kansas City, Mo.; S. M. Bush, Uvalde, Tex.

Valley & Siletz

First Track: From Camp 1 to Valsetz, Ore., 2.10 miles.

Virginian

Other Important Work Under Construction: Virginian-Wyoming building from Maben, W. Va., to Raleigh-Wyoming Coal Company's mine, 14.45 miles. Contractors, W. W. Boxley & Co., Roanoke, Va., and Porter Brothers, Norfolk.

Wabash Railroad

Other Important Work Under Construction: Reconstructing draw-bridge over Rouge river, Detroit, Mich., cost $750,000, 12 per cent completed.

Western Maryland

Other Important Work Under Construction: Coal pier at Port Covington, Baltimore, Md., cost $700,000, 78 per cent completed.

Western Pacific

First Track: In California from southwest of Hawley to a point west, 12.61 miles.

Wheeling & Lake Erie

Other Important Work Under Construction: Engine terminal, Canton, Ohio, and additions to Gambrinus yards, cost $573,380, 12 per cent completed; engine terminal at Jewett, Ohio, including additions to present yards, cost $486,305, 15 per cent completed.

Willacoochee & Du Pont

First Track: In Georgia, not specified, 2 miles.
Other Important Work Under Construction: Building from Shaws Still, Ga., to Du Pont, 19 miles. Contractors, C. M. Green, Willacoochee, Ga.

Willamina & Grande Ronde

First Track: In Oregon, not specified, 1 mile.
Other Important Work Under Construction: Building from Willamina, Ore., to Bentley, 7.76 miles, company forces doing the work.

Winchester & Western

First Track: In West Virginia, not specified, 8 miles.

Railroad Construction in Canada in 1920

Canadian National Railways

First Track: In Nova Scotia from Halifax Ocean Terminals Railway to Halifax & South Western Railway near Fairview, 0.68 miles. In New Brunswick, from St. John's to Newcastle (Moncton Cut off) 3.86 miles. In Quebec, from Charlotte to Ste. Rosalie, 4.70 miles. In Saskatchewan, from Alaska southeasterly, 2.60 miles; between Melfort and Humbolt, 33.40 miles; from Swift Current extension, 6.70 miles; on Jackfish branch, 10 miles. In Alberta, between Hanna and Medicine Hat, 10 miles; from Munson, 3 miles; from Oliver branch, 23.10 miles; from Onaway branch, 18.10 miles; from Red Deer spur, 6.40 miles. In Manitoba, from Thunderhill extension, 8.30 miles. In British Columbia from Koksitah river to Siwash Rips Cowichan river, Vancouver Island, 19.30 miles.
Second Track: In Nova Scotia, from Springhill to Maccan, 9.13 miles; from Truro to Belmont, 7.69 miles. In Quebec, from Bagot to Ste. Rosalie, 10.94 miles. In Alberta, between Munson and Wayne, 0.84 miles; from Munson, 3 miles.
Other Important Work Under Construction: Engine terminal facilities at Fairview, N. S., cost $824,000, 10 per cent completed; new bridge and track realinement, at Tantramar river, Amherst, N. S., cost $550,000, 50 per cent completed; yard and terminal facilities at Moncton, N. B., cost $1,175,000, 9 per cent completed; yard improvements at St. John's, N. B., cost $255,500, 73 per cent completed; revision of grade and alinement, McGivney Junction to Fredericton, N. B., cost $264,000, 50 per cent completed; new terminal facilities at Chaudiere Junction, Que., cost $340,000, 20 per cent completed; new station at Levis, Que., cost $130,000, completed; yard and facilities at Dartmouth, N. S., cost $300,000, completed; Rosebud river bridge Drumheller (Alberta) subdivision, cost $117,000, 93 per cent completed; Red Deer (Alberta) river bridge, mile post 59.3, contract let to the Dominion Bridge Company, cost $250,000, work just started; South Saskatchewan river bridge improvements at mile post 159.8, Duck Lake sub-division, contract let to

the Dominion Bridge Company, cost $340,000, work just started; building from Siwash Rips Cowichan river to Alberni, V. I., 74.40 miles, work being done by Canadian Northern Pacific forces; building from Kamloops, B. C., to Kelowna and from Vernor to Lumby, 133 miles, contractors, John W. Stewart & Company, Vancouver, B. C.; survey under way from Cowichan river to East Coast, Vancouver Island, 14 miles; engine terminal facilities at Victoria, B. C., cost $170,000, 80 per cent completed.

Canadian Pacific

First Track: Russell, Manitoba, northerly, 6.50 miles; Lanigan, Saskatchewan, northeasterly, 50 miles; Moose Jaw, Saskatchewan, southwest (Consul East) 1.5 miles; from Leader, Saskatchewan, 26. miles; Langdon, Alberta, north (Acme-Empress), 18.50 miles.

Other Important Work Under Construction: Work is now under way, building from Russell, Manitoba, northerly, 5.8 miles; from Moose Jaw, Saskatchewan (Consul East), 58.50 miles; Wymark-Archive line, 25. miles; Bassano, easterly (Milden-Empress) 59. miles; Rosetown, Saskatchewan, southeast, 43.20 miles; Leader, 9.20 miles, in Saskatchewan, 14.80 miles, in Alberta; Langdon, Alberta, north 18.80 miles; Weyburn-Stirling, Alberta (Altawan West), 18.90 miles.

Canada & Gulf Terminal

First Track: In the Province of Quebec, not specified, 2.50 miles.

Esquimalt & Nanaimo Railway

Other Important Work Under Construction: Building from Alberni, Vancouver Island, to Great Central Lake, 10 miles. Contractors: Foundation Company of British Columbia, Ltd., Vancouver, B. C.

Grand Trunk

Other Important Work Under Construction: Western Lines—Additional team-tracks and freight house extension and land for site for new yard at Pontiac, Mich., cost $250,000; new passenger and freight station at St. John, Mich., cost $106,000, completed.

Kettle Valley

First Track: From Princeton, B. C., to Loffer mountain mine, 7.25 miles.

Other Important Work Under Construction: Building from South Penticton, B. C., to Dog Lake, 2.40 miles, contractors, P. J. Salons, Penticton, B. C.

Pacific Great Eastern

First Track: In British Columbia, not specified, 37 miles.

Other Important Work Under Construction: In British Columbia building from present end of track at mile post 331 to mile post 427 on the Grand Trunk Pacific; contractors, Northeastern Construction Company, Vancouver, B. C.

Quebec Central

Other Important Work Under Construction: Building from Scotts, County Beauce, Quebec, to Diamond Junction, St. Jean Chrysostome, County Levis, 19.33 miles; contractors, J. T. & J. F. Davis, Quebec, Canada.

Reid Newfoundland Company

First Track: Branch line to Argentia, N. F., 3.50 miles.

Other Important Work Under Construction: Wharf and terminal buildings at Port-aux-Basques, N. F., 70 per cent completed.

Roberval-Saguenay Railroad

First Track: At Port Alfred, Que., 2 miles and at Portage des Roches, 0.50 mile.

Other Important Work Under Construction: Harbor wharves cost $750,000.

Railroad Construction in Mexico in 1920

National Railways of Mexico

First Track: Between Durango, Mex., to the port of Mazatlan, 21.13 miles; between Cuatro Cienegas and Sierra Mojada, state of Coahuila, 39.77 miles.

Other Important Work Under Construction: Building from Durango, state of Durango, to the port of Mazatlan, on the Pacific coast, 250 miles, about 87 miles from Durango has been completed, contractors, E. E. Shaw, Durango; Building from Cuatro Cienegas to Sierre Mojada, state of Coahuila, 99.42 miles, track has been completed on about 76 miles, work is being done by company's forces; building between Allende and Las Vacas, state of Coahuila, 75.80 miles, work is being done by company's forces; building from Empalme Purisima on the Durango-Mazatlan line to Las Animas, 31 miles, of which 19 miles have been completed, contractor, E. C. Rosas, Durango; building new station in Durango to cost $250,000, masonry and concrete work completed; grade reduction under way from Saltillo to Carneros, 34 miles; building new passenger station at Saltillo, nearing completion.

FEEDING THE COMMUTER ON KEY SYSTEM BOATS.—The San Francisco-Oakland Terminal (Key System), served meals to 62,273 passengers on its ferry boats during May, 1920, according to C. D. Bennetts, superintendent of the service department, who recently discussed the growth of the company's restaurant business before the Pacific Railway Club. Mr. Bennetts said that lunch counter facilities were provided on the boats first put into service by the Key System in 1903, and that after a short trial at leasing them to outsiders, which proved unsatisfactory, the company organized its own commissary department. As additional steamers were built, they were also equipped with restaurants, which have been enlarged and re-equipped at frequent intervals to take care of the growing number of patrons who must be served in the twenty minutees that the boats are en route. This need for quick service has led to specialization in a few popular dishes, such as coffee, soup, hash and pie. The food is prepared by Chinese cooks in the company's kitchen in the Ferry Building, San Francisco, and is kept hot on the boat by steam tables Revenue from the restaurant totaled $19,197.50 in May, and Mr. Bennetts estimated that during that month 5 per cent of the Key System's passengers were served.

Photo by Ewing Galloway, N. Y.

Michigan Central Yards at Detroit

Signal and Interlocking Work Reaches Low Mark

Reports Indicate That Construction Activities Were Lighter Than During Any Period Since 1905

A TOTAL of 523.5 miles of road in the United States and Canada was equipped with block signals during the past year. Some of this mileage represents new construction, a portion represents reconstruction, and a part consists of manual block changed to automatic block. Twenty-five roads built new interlocking plants or made changes in existing ones, affecting a total of 86 plants. It is hard to arrive at any definite conclusion as to the number of new interlocking plants installed during this period because a large number of the railroads failed to include in their reports sufficient information to show whether or not the work completed represented new facilities. Where automatic signaling was in use previously, the changes were due largely to replacing one type of signals with another, or on account of additional main tracks.

Comparing the figures for 1920 with those for 1919, published in the January 2, 1920, issue of the *Railway Age*, it is readily seen that a decided drop has occurred in construction work of this character, as the total block signal mileage completed in the United States and Canada during year 1919 was 2,071, as compared to 523.5 miles of road in 1920, or only about 25 per cent of that of the preceding year. Of this 523.5 miles, 515.2 represents the amount completed during the year on roads in the United States. Deducting 1.7 miles manual blocking from the total, leaves 513.5 miles of road upon which automatic block signals were installed during the year. Comparing this mileage with that reported by the Interstate Commerce Commission as of January 1, 1920, and which is recorded in the table showing block signals installed in the United States since January 1, 1907, there appears to have been 466 miles less automatic block signaling completed during 1920 than in 1919. In each and every year shown in that table the mileage of automatic block signals installed was more than double that reported for the year now closed.

ONLY 515 MILES of road in the United States were equipped with block signals during the past year; there are 206 miles under construction and 442 miles are known to be proposed for 1921.

Forty-five interlocking plants were completed; 19 are under construction and 22 are proposed for the coming year. These are the smallest construction figures reported for many years.

Statistics of telegraph line construction are given this year for the first time.

Under Construction.—In comparing the total mileage of block signals under construction in the United States and Canada on December 31, 1920, and that under construction on the same date in 1919, it is seen that there is now a decrease of 64.2 miles. The total mileage under construction on December 31, 1920, consists of automatic block signals in the United States, no Canadian roads having reported any work in progress. While no statements have been made indicating that the automatic block is to replace manual block, all, or a large part of this work in progress is of this character. No road reports any manual block signals under construction.

Proposed Work.—The outlook for proposed new work for 1921 is very indefinite at present, as a large number of roads have not yet decided on their budgets. In making a comparison of the block signal mileage proposed for next year with that proposed one year ago, it is seen that there is an increase over that of a year ago of 78.7 miles of road. The proposed new work reported includes a total of 398.7 miles of automatic block signals in the United States, and 43 miles in Canada.

Interlocking.—A decided slump has occurred in the number of interlocking plants built or rebuilt during the year. In 1919 a total of 153 were built or rebuilt in the United States, and four in Canada, as compared to 45 this year, two of which are in Canada. Likewise the number of plants under construction in the United States on December 31, 1919, was 46, and 3 in Canada, as compared to 19 this year, one of which is in Canada. A total of 39 plants was proposed a year ago, 3 being in Canada, in comparison with a total of 22 for the coming year, all of which are in the United States.

An Outline of the Work

The figures so far available, together with the data covering work now under construction and in respect to plans for 1921, are shown in the accompanying tables. The data will be found in the tables under nine heads, as follows:

A—Automatic Block Signaling Completed in 1920.
B—Automatic Block Signaling Under Construction.
C—Automatic Block Signaling Proposed for 1921.
D—Manual Block Signaling Completed in 1920.
E—Manual Block Signaling Under Construction (None).
F—Manual Block Signaling Proposed for 1921 (None).
G—Interlocking Completed in 1920.
H—Interlocking Under Construction.
I—Interlocking Proposed for 1921.

From the reports received, the largest mileage of automatic signals installed on a single road was on the Chicago, Burlington & Quincy, which put in service 144.3 miles of single track and 9.3 miles of double track, using 359 signals.

NEW BLOCK SIGNALS COMPLETED IN 1920

	Automatic (Table A)			Manual (Table B)			
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	Both total miles
United States	378.9	134.6	513.5	1.7	...	1.7	515.2
Canada	6.3	2.0	8.3	...	...	...	8.3

NEW BLOCK SIGNALS UNDER CONSTRUCTION DEC. 31, 1920

	Automatic (Table B)			Manual (Table E)			
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	Both total miles
United States	148.9	56.9	205.8	...	...	...	205.8
Canada	....	....	....	...	...	...	....

NEW BLOCK SIGNALS PROPOSED FOR 1921

	Automatic (Table C)			Manual (Table F)			
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	Both total miles
United States	361.0	37.7	398.7	...	...	...	398.7
Canada	43.0	....	43.0	...	...	...	43.0

INTERLOCKING PLANTS—TABLE G

Completed in 1920	No of plants	Number of levers: Mechanical	Number of levers: Electric*
United States	43	517	295
Canada	2	19	...

UNDER CONSTRUCTION DEC. 31, 1920—TABLE H

	No of plants	Number of levers: Mechanical	Number of levers: Electric*
United States	18	131	283
Canada	1	13	...

PROPOSED FOR 1921—TABLE I

	No of plants	Number of levers: Mechanical	Number of levers: Electric*
United States	22	153	232
Canada	...	...	...
Total United States	83	800	810
Total Canada	3	32	...
Grand total	86	832	810

*Including Push-button (non-interlocking) machines.

TOTAL CONSTRUCTION—TWELVE YEARS

Year	Miles of road: Automatic Block	Manual Block	Total
1908	1,387.6	— 517.6	870.0
1909	2,047.1	4,162.2	6,209.3
1910	3,473.8	2,037.3	5,511.1
1911	2,623.4	2,517.2	5,140.6
1912	1,883.9	5,656.2	7,540.1
1913	4,350.5	—1,563.4	2,787.1
1914	3,030.7	6,511.5	9,542.2
1915	1,113.1	—1,112.0	1.1
1916	1,843.5	— 196.9	1,646.6
1917	2,242.2	—1,214.9	1,027.3
1918	1,794.9	—1,398.4	396.5
1919	**979.4**	**1,007.1**	**1,986.5**

The next largest installations were made on the Missouri, Kansas & Texas and on the Northern Pacific, each installing 83 miles of single track signals, the first road using 151 signals, two of which were the color light type, and the latter using 150. Signals installed on other roads consisted mostly in the protection of short stretches of track; on additional new multiple tracks or for station protection purposes. In Canada, three short stretches of single track automatic block signals, totaling 6.3 miles, were put in service on the Canadian Pacific, Western lines, mostly for station protection, while the Grand Trunk installed 2.0 miles for the same purpose.

But ten roads report automatic block signals under construction, the greatest mileage reported being by the Chicago, Burlington & Quincy, which has 71 miles of single track signaling under construction. The Chesapeake & Ohio has under construction, 40 miles of single track, A. P. B. color light automatic signals, while the Baltimore & Ohio has 21.6 miles of double track signaling, and the Illinois Central has 19.7 miles of single track signaling under construction.

Of the work proposed for 1921, out of eight roads reporting such work, the Chicago, Milwaukee & St. Paul contemplates the construction of 122 miles of single track signaling, using 220 motor semaphore signals removed from the electrified zone, while the Missouri, Kansas & Texas is also planning on 168.5 miles of single track automatics, using a total of 282 signals.

The reports from the various roads on proposed block signaling are rather incomplete, inasmuch as most of the roads have not yet prepared their programs or had their budgets approved for the 1921 work.

The only manual block signaling reported as installed during 1920, consisted of 1.7 miles of single track, of which 0.98 mile replaced automatic block. No signaling of this character was under construction on December 31, 1920, nor did any roads report any such work contemplated.

Automatic Train Control

The use of automatic train control as an adjunct to automatic block signals has been reported as completed during 1920 on the Chicago, Rock Island & Pacific, between Blue Island, Ill., and Joliet, a distance of 25 miles. It is installed on double track in connection with automatic block signals already in service, and is of the intermittent electrical contact type. An installation of automatic train control is under construction on the Chesapeake & Ohio, between Charlottesville, Va., and Staunton, a distance of 40 miles. Low voltage color light signals with approach lighting is also being installed in connection with the train control. The automatic train control under construction is an extension of the system already in use between Gordonsville, Va., and Charlottesville.

Interlocking

Twenty-five roads report interlocking plants as completed during the past year, and Table G gives this list in detail. This table, however, should be taken more as an exhibit of the work done than as showing the precise amount of the increase of interlocking apparatus in use in the country, some of the figures representing only reconstruction or enlargements. Some duplications necessarily occur, as a joint plant may be reported by two or more roads. The same remarks apply also to Tables H and I.

One striking feature indicating the small amount of work done during the past year, under construction or contemplated, aside from the small number of entries in the tables, is the small size of the plants installed, those predominating being of the mechanical type. An analysis of the plants shows that the largest electric plant completed during the year is one of 64 working levers at Barboursville, W. Va., on the Chesapeake & Ohio, while the next largest is one with 40 working levers at Pittsburgh, Pa., on the Pennsylvania. The third largest plant of this type had 33 working levers, and was installed at Weston, N. J., on the Philadelphia & Reading, while the fourth largest consisted of 29 working levers at Newark, N. J., on the Lehigh Valley.

One 20-push-button electro-pneumatic machine was reported as completed during the year at the Russell, Ky., yards of the Chesapeake & Ohio.

Five electro-mechanical plants were reported as completed; one plant on the Philadelphia & Reading having 32 me-

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1920

Name of road	Miles of road S.T.	Miles of road D.T.	From	To	No. of signals	Type of signals	Control System	Remarks
A. T. & S. F.	....	13.7	Winfield J.	Ark. City	19	Union "S"	Neutral track and line	
	....	12.3	Ark. City	Newkirk, Okl.	16	Union "S"	Neutral track and line	
	3.1	....	Bakersf'd, Cal.	Oil Junc.	16	Union "S"	Neutral track and line	
A. T. & S. F. (Coast Lines)	3.1	....	Bakersfield, Cal.	Jastro	7	U.S. & S.Co. 3-pos. U.Q.	Polarized line	
B. & O.	....	13.2	Goehring, Pa.	Callery Jct.	40	U. S. & S. Co. "T 2"		
	....	12.7	Greenwich, O.	Willard, W. Va.	20	General		
B. & M.	4.9	....	Westminster, Mass.	S. Ashburnham	7	Union style B		On one track of 3-track line.
Can. Pac. Lines West	1.2	....	Minnitaki, Ont.		1	Union "T 2"	Neutral track	Station protection.
	2.7	....	Austin, Man.		1	Union "T 2"	Neutral track	Station protection.
	2.4	....	M. P. 124.7	M. P. 127.1	2	General "2 A"	Neutral track and line	
C. & A.	....	12.0	Nilwood, Ill.	Rinaker	11	General "2 A"		
C. B. & Q.	67.4	....	Savannah, Ill.	Flag Center	146	Federal	A. P. B.	60 deg. L. Q., 10 volt.
	....	9.3	Flag Center, Ill.	Steward Jct.	25	Federal		60 deg. L. Q., 10 volt.
	16.1	....	Oxford, Neb.	Arapahoe	31	Federal	A. P. B.	60 deg. L. Q., 10 volt.
	60.8	....	Lincoln, Neb.	Bradshaw	157	Federal	A. P. B.	60 deg. L. Q., 10 volt.
C. R. I. & P.	3.0	....	Faribault, Minn.	Medford	5	Electric Sema.	Neutral line	Two-pos. U. Q. motor sema.
E. J. & E.	0.5	....	Joliet, Ill.		2			
Grand Trunk	15.0	....	Bates, Me.	Oxford	18	General "2 A"	A. P. B.	
	....	2.0	Port Hope, Ont.		2	Federal "4 A"	Normal clear	Station protection.
Lehigh Valley	....	1.6	Laurel Jct., Pa.	Delano	7	Federal	Line	
	2.1	....	Falling Springs, Pa.	Weldon	6	General	Line	
L. A. & S. L.	2.5	....	Smelter, Utah	Garfield	4	3-pos. U. Q.	A. P. B.	Addition for pas'g track.
L. & N.	....	13.0	Maplewood, Tenn.	Brentwood	26	3-pos. U. Q.	A. C. polar. track	A. C. signals.
M. K. & T.	6.0	....	M. P. 16	Devol	16	3-pos. U. Q.	Overlap	Normal clear.
	6.5	....	Mahan, Okla.	Riversand	14	3-pos. U. Q.	Overlap	Normal clear.
	65.5	....	Wybark, Okla.	McAlester	116	3-pos. U. Q.	Overlap	Normal clear.
	2.3	....	Colbert, Okla.	Red River	3	3-pos. U. Q.	Overlap	Normal clear.
	2.4	....	San Antonio, Tex.		2	Color-light	Overlap	
Mo. Pac.	1.6	....	Boonville, Mo.		2	3-pos. U. Q.		
	0.8	....	Monroe Jct., La.		1	3-pos. U. Q.		
	1.0	....	Bald Knob, Ark.		1	2-pos. U. Q.		
	....	1.0	West Side Jct., Neb.		2	2-pos. U. Q.		
	0.3	....	Dupo, Ill.		2	2-pos. U. Q.		
	1.3	....	Valley Jct., Ill.		2	2-pos. U. Q.		
N. Y. N. H. & H.	....	1.0	Readville		2	2A	Polarized	
	....	1.6	Warren, R. I.	Barrington Rirer	3	"B"	Polarized	
	....	1.0	Providence		8	"B"	Polarized	
Nor. Pac.	83.0	....	Terry, Mont.	Forsyth	150	General "2 A"	A. P. B.	Base of mast. 10-v. mech. d. c.
Pacific Electric	0.5	....			4	Color light	A. C.	
Penn. System:								
Southwestern Region	....	4.5	Clymers, Ind.	Logansport	10	Union Style B		Normal clear.
Central Region	....	14.3	Alliance, O.	Canton	26	Union Style B, U. Q.		D. C.
Pere Marquette	26.0	....	Grand Ledge	Elindale	34	Union	Polarized line	Overlaps.
	....	3.0	Wyoming	G. Rapids	8	Union	Polarized line	
P. & R.	....	7.5	Belle Meade, N. J.	Manville	40	Union 3-pos. U. Q.	Normal danger	*Four track*, A. C. replacing D. C. disk signals.
	....	1.2	Manville, N. J.	Bound Brook Jct.	5	Union 3-pos. U. Q.	Normal danger	A. C. system replacing D. C. disk signals.
Southern	....	8.5	Huffmans, Tenn.	Mountain Jct.	15	General "2 A"	Direct current	
	....	3.2	Vance, Ala.	Dowdle	6	General "2 A"	Direct current	
Sou. Pac.	3.2	....	Hornbrook, Cal.	Gregory, Ore.	6	Union		
Total	385.2	136.6			1,047			

chanical and 35 electric working levers being revised. The largest electro-mechanical plant installed was on the Jacksonville, Fla., terminal, and this consisted of 27 mechanical and 13 electric working levers. A small electro-mechanical plant of 7 working levers, and provided with position light signals, was installed by the Pennsylvania on a drawbridge.

The largest mechanical plant installed was on the Missouri Pacific at Sedalia, Mo., and had 36 working levers, while the largest one revised was on the P. & R. at Belle Meade, N. J., with 46 working levers. Other plants ranged in size from the smallest up to the size given above. Some were of the cabin door lock type, others had time locks; still others had electric locks, while still others had power-operated distant signals as adjuncts.

The largest electric interlocking plant under construction on December 31, 1920, was at Richmond, Ind., on the Pennsylvania System, and consists of 44 working levers; the next in size being one of 29 working levers at Myerstown, Pa. on the P. & R.

The New York, New Haven & Hartford has under construction two electro-pneumatic push button plants for hump yards at Providence, R. I., and New Haven, Conn., each having 60 push buttons.

The largest electro-mechanical plant under construction as of the above date is one of 43 working levers at Mountain Lake Park on the Baltimore & Ohio, while the Chesapeake & Ohio is building one having 20 mechanical and 18 electric working levers at Kenova, W. Va.

The largest mechanical plant under construction is one of 29 working levers at Madison, Ill., on the Toledo, St. Louis & Western.

Of those proposed for 1921, the largest electric plant is one of 49 working levers to be located at Carlton, Minn., on the Great Northern; the next largest being one of 33 working

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION, DECEMBER 31, 1920

Name of road	Miles of road S.T.	Miles of road D.T.	From	To	No. of signals	Type of signals	Control System	Remarks
A. T. & S. F.	....	11.5	Plymouth	Strong City	13	Union "T"	Neutral track and line	
B. & O.	....	21.6	Callery, Pa.	Willow Gr., W.Va.	43	Union T 2		
Ches. & Ohio	40.0	....	Charl'vil	Staunton	87	Color light 3-pos.	A. P. B.	Am. Train Control Co.'s A. C. automatic train control apparatus included in this installation.
C. & N. W.	1.6	....	Belt Line Jct., Wis.	Hurley Jct.	8	General 2 A. U. Q.	A. P. B.	
C. B. & Q.	38.5	....	Steward Jct., Ill.	Aurora	93	Federal	A. P. B.	60 deg. L. Q. 10 volts.
	32.5	....	Bradshaw, Neb.	Grand Island	75	Federal	A. P. B.	60 deg. L. Q. 10 volts.
Illinois Central	19.7	....	Ilsley, Ky.	Princeton	36	Hall "L" 3-pos. U. Q.	A. P. B.	
N. Y. N. H. & H.	....	1.1	N. Haven		6	{ Light (2) } { "2A" (4) }	Line	To shorten block sections.
P. & R.	....	5.5	Myerstown, Pa.	Lebanon	18	Union 3-pos. U. Q.	Normal danger	A. C. *Four track.*
Sou. Pac.	6.3	....	Hornbrook, Cal.	Gregory, Ore.	22	Union		On electric lines; A. C.
	10.3	....	Portland, Ore.	Beaverton	22	Color-light		
Virginian	....	17.2	M. P. 359.3	M. P. 376.5	34	Union "S" 3-pos. U. Q.	Alternating current	
Total	148.9	56.9			457			

TABLE C—AUTOMATIC BLOCK SIGNALS—PROPOSED NEW CONSTRUCTION, 1921

Name of road	Miles of road S.T.	D.T.	From	To	No. of signals	Type of signals	Control System	Remarks
Can. Pac. Lines West	21.0	....	Leancholl, B. C.	Golden	32		A. P. B.	
	22.0	....	Glazier, B. C.	Albert Canyon	39		A. P. B.	
C. M. & St. P.	122.0	....	Mobridge, S. D.	Hettinger, N. D.	220	D. C. 3-pos.		Bottom-mast. Removed from electric zone.
C. T. H. & S. E.	....	....	Terre Haute, Ind.		2			Shortening blocks.
E. P. & S. W.	50.0	....	Winkle, N. M. / Carrizozo, N. M.	Guadalupe / Temporal	..		Overlap	
Grand Trunk	13.5	....	Oxford, Me.	Danville Jct.	22		A. P. B.	
M. K. & T.	37.0	....	McAlester, Okla.	Stringtown	61	U. Q. 3-pos.	Normal clear, overlap	
	99.0	....	Labette, Kan.	Wybark, Okla.	161	U. Q. 3-pos.	Normal clear, overlap	
	14.5	....	Denison, Tex.	Bells	25	U. Q. 3-pos.	Normal clear, overlap	
	18.0	....	Pottsboro, Tex.	Whitesboro	35	U. Q. 3-pos.	Normal clear, overlap	
No. Ohio Trac. & Lgt.	7.0	....	Akron, O.	Springfield Lake	10	Union Semaphore	Alternating current	
Union Pacific	....	37.7	Leroy, Wyo.	Wahsatch, Utah	134	Union Style B 2-pos.		Two-arm home and distant signals.
Total	404.0	37.7			741			

TABLE D—MANUAL BLOCK SIGNALING INSTALLED IN 1920

Name of road	Miles of road S.T.	D.T.	From	To	No. of signals	Type of signals	Control System	Remarks
Mo. Pac.	1.7	....	Edgewater Jct., Kan.	High Line Con.	7	2-pos. U. Q.		0.98 mi. automatic block replaced by manual block.

levers on the Buffalo, Rochester & Pittsburgh at Falls Creek, Pa.

No electro-pneumatic plants are reported as contemplated next year. Three electro-mechanical plants are proposed for construction on the Chesapeake & Ohio, the largest one to have 20 working levers.

The largest mechanical plant proposed is one of 26 working levers on the P. & R. at Schuylkill Haven, Pa. This plant is to be equipped with approach and route locking; the next largest proposed is on the Texas & Pacific at Ranger, Tex., and it is to consist of 24 working levers.

TABLE G—INTERLOCKING PLANTS COMPLETED IN 1920

Name of road	Location	Layout	Working levers[1]
A. T. & S. F.	Turner, Kan.	Yard	17[25]
	Morris, Kan.		13[25]
	Hackney, Kan.	E. D. T.	14[25]
	Chilocco, Okl.		17[21]
	Hutchinson, Kan.	Cros'g, M. P. Ry.	31[27]
	Hutchinson, Kan.	Cros'g C. R. I. & P.	30[25]
A. C. L.	Tampa, Fla.	Drawbridge	8
Jacksonville Term'l.	Jacksonville, Fla.	Crossing	40[2]
Bessemer & L. E.	Culmerville, Pa.	Gauntlet	4
Canadian Pacific:			
Lines West	Russell, Man.	Crossing	13
Ches. & Ohio	Barboursville, W. Va.	Junction	E64[28]
	Russell, Ky.	Term.	13[29]
	Russell, Ky.	Yard[30]	
	Prince, W. Va.	Junction	17[31]
Chi. B. & Q.	Aurora, Ill.	Junction[3]	..
Chi. R. I. & P.			
C. T. H. & S. E.	Johannott, Ill.	Crossing	12[4]
Col. & So.	Denver, Colo.	Crossing	2
Great Northern	Fernie, B. C.	Crossing	6[5]
Gulf M. & Nor.	Bemis, Tenn.	Crossing	29[6]
Illinois Central	Bemis, Tenn.	Crossing	29
Ill. Traction	Springfield	Crossing	8[32]
Lehigh Valley	Newark, N. J.	Junction	E 29
L. A. & S. Lake	Spanish Fork, Utah	Crossing	17
L. & N.	Columbia River, Tenn.	Gauntlet	4[8]
	Easton, Tenn.	Crossing	7[9]
	Mobile, Ala.	Drawbridge	4[10]
Mo. Pac.	Leeds, Mo.	Junction	5[11]
	Falls City, Nebr.	Crossing	23[12]
	Sedalia, Mo.	Crossing	36[13]
N. Y. N. H. & H.	New Haven	Term.	11[33]
Pennsylvania:			
Eastern Region	Darby Creek, Pa.	Drawbridge	E 7[14]
Central Region	Pittsburgh, Pa.	Junction	E 40
Phila. & R.	Glenmoore, N. J.	Crossovers	E 16
	Belle Meade, N. J.	Crossovers	46[15]
	Weston, N. J.	Junction	E 33
	Manville Crossing, N. J.	Crossing	67[16]
	Bound Brook Jct., N. J.	Junction	40[20]
Southern	New River, Tenn.	Junction	E 15[15]
	Robbins, Tenn.	Junction	E 21[15]
	Ten Mile, S. C.	Crossing	4
Toronto H. & B.	Hamilton, Ont.	Crossing	4
Union Pacific	St. Joseph, Mo.	Drawbridge	24
	Norfolk, Nebr.	Crossing	9
O. S. L.	Montana Jct., Idaho	Junction	E 2[17]
Virginian	Tidewater Junction, Va.	Crossing	E 6[17]
			821

[1] All levers are mechanical, except in items indicated by E, which are electric. The totals are 546 mechanical, and 260 electric.
[2] Electro-mechanical machine; 27 mechanical levers and 13 electric.
[3] Mechanical plant moved to new elevation.
[4] Electric distant signals.
[5] With time locks.
[6] Electric time clocks.
[7] Mechanical derails; electrically controlled signals. Semi-automatic signals on L. A. & St. L. with approach locking. Hayes derails on transverse line, operated from switch stand and controlled by electric lock.
[8] A. C. signals and track circuits.
[9] A. C. signals and track circuits.
[10] Rebuilt.
[11] Electric signals; approach and detector locking.
[12] Rebuilt; approach and detector locking.
[13] Electric signals; approach and detector locking.
[14] Electro-mechanical; position-light signals.
[15] Advance and detector locking.
[16] Mechanical levers; low voltage electric machine for switches at far end of adjacent tunnel. Advance and detector locking.
[17] Addition to existing machine.
[18] Revision.
[19] Revision of electro-mechanical plant; 32 mechanical, and 35 electric levers.
[20] Revision.
[25] Approach, indication and section locking.
[26] Approach, indication and section locking, and low voltage switch movements.
[27] Approach, indication and section locking, and polarized relay control.
[28] Frequency selective traffic locking.
[29] Mechanical levers 6, electric 7.
[30] Pushbutton machine, electro pneumatic, 20 buttons.
[31] Mechanical levers 9, electric 8, voltage switch movements.
[32] Cabin-door lock.
[33] Style F, union; enlargement.

TABLE H—INTERLOCKING PLANTS NOW UNDER CONSTRUCTION

Name of road	Location	Layout	Working levers[1]
A. C. L.	Allenhurst, Ga.	Crossing	6[2]
A. T. & S. F.	New Kirk, Okla.	Yard	E 15[25]
B. & O.	Mountain Lake Park	Junction	43[3]
B. & M.	So. Lawrence, Mass.	Yard	24
Can. Pacific	Watson, Sask.	Crossing	13
Ches. & Ohio	Big Sandy J.	Junction	20[26]
	Kenova, W. Va.	Junction	38[27]
C. & N. W.	Hurley, Wis.	Junction	8
Kan. City So.	De Queen, Ark.	Crossing	12
L. & N.	Mayton, Tenn.	Junction	8[4]
	Brentwood, Tenn.	Junction	4[4]
N. Y. N. H. & H.	Providence	Terminal[28]	..
	New Haven	Hump Yard[29]	..
	New Haven	C. Hill Yard	12
Pacific Elec.	Wise, Cal.	Crossing	10[30]
Pennsylvania			
S. W. Region	Richmond, Ind.	Yard	E 44[5]
Phila. & R.	Myerstown, Pa.	Crossovers	E 29
Tol. St. L. & W.	Madison, Ill.	Crossing	29
Union Pac.			
O. S. L.	Salt Lake City	Terminal	E 4[6]
			319

[1] Electric levers indicated by E. Total is 156 mechanical and 163 electric.
[2] Door locked.
[3] Electro-mechanical.
[4] Temporary plant.
[5] Complete electric route and detector locking; position-light dwarf signals.
[6] Addition to existing machine.
[25] Approach, indication and section locking.
[26] Mechanical levers 10, electric 10; frequency selective traffic locking.
[27] Mechanical levers 20, electric 18; frequency selective locking.
[28] Pushbutton mechanism electro-pneumatic, 60 buttons.
[29] Pushbutton, 60 buttons; also certain switches electrically and mechanically locked for control of movements to repair tracks.
[30] A. C. track circuits; time locks on steam road.

The General Outlook

The general outlook a year ago indicated that signal construction work would show some signs of picking up before now, but instead less work was completed than in any year

since 1908. This results from the conditions which have affected the railroads during the past four years and it is because of the readjustment taking place now in the railroad field that the outlook as to next year's budgets is so uncertain. The principal reason for this uncertainty is the inability of the railroads to get money at reasonable rates. This has been further complicated by the action of the government in holding up the amounts due the railroads for the time they were under government control.

TABLE I—NEW INTERLOCKING PROPOSED FOR 1921

Name of road	Location	Layout	Working levers[1]
B. & O.	Deshler, O.	Crossing	
	Defiance, O.	Crossing	
	Fostoria, O.	Crossing	
B. R. & P.	Falls Creek, Pa.	Crossing & Junct.	E 33
Ches. & Ohio	Hinton, W. Va.	Terminal	20[25]
	Hilldale, W. Va.	Crossovers	20[26]
	MacDougal, W. Va.	Crossing	17[2]
C. Ind. & L.	Rochdale, Ind.	Crossovers	5[27]
	Ladoga, Ind.	Crossing	17[3]
Col. & So.	Denver, Colo.	Crossing	
Del. & Hudson	Schoharie Junct., N. Y.	Junction	E 28[4]
Erie	Newark, N. J.	Drawbridge	E 11
Great Northern	Carlton, Minn.	Crossing	E 49
M. K. & Texas	Oklahoma City, Okla.	Crossing	18[5]
Phila. & R.	Schuylkill Haven, Pa.	Crossovers	26[6]
Southern	Blyce, Tenn.	Drawbridge	E 6[6]
	Epes, Miss.	Drawbridge	F 6[6]
Texas & P.	Ranger, Tex.	Crossing	24
	Cisco, Tex.	Crossing	24
Union Pacific	Aspen, Wyo.	End double track	E 20[7]
	Altamont, Wyo.	Yards and tunnel	E 22[7]
Western Pacific	San Jose, Cal.	Crossings	E 39[8]
			385

[1] Electric levers indicated by E. Total, 153 mechanical levers and 232 electric.
[2] Electric signals.
[3] Electric signals.
[4] Approach, route and detector locking.
[5] Electric distant signals.
[6] Approach and route locking.
[7] Check locking between Aspen and Altamont towers.
[8] Includes three plants.
[25] Mechanical levers 9, electric 11; frequency selective traffic locking.
[26] Mechanical levers 15, electric 5.
[27] Mechanical levers 3, electric 2.

The high cost of material and all kinds of labor are also directly affecting the future programs. The material market is further complicated by the fact that the basic materials have fluctuated so radically in cost during the past year that it is difficult to judge what the coming year may have in store in the way of prices for the raw materials, and this will affect the quotations which can be made on signal materials. Labor conditions are by no means stable as a readjustment is taking place in this field as well as in other fields. As a consequence the tendency is to follow a hand to mouth policy until conditions approach a more nearly normal stage.

Developments of the Past Year

A review of the conditions during the past year indicates that greater attention has been given to automatic train control than ever before, with the prospects that more installations of this character will be made during the coming year. Railway men in general also have shown a keener appreciation of the value of automatic signaling with reference to its use in effecting economies in train operation. In this connection attention has been directed to the elimination of train orders by making the greatest use of the signal system. Electric lighting of signals has advanced quite rapidly, this advance being helped by the possibility of eliminating lampmen, whose wages have been materially increased. Further replacement of gravity battery with caustic soda cells has also taken place as this helps reduce maintenance costs. The track circuit has received marked attention, with the result that low resistance bonds have been developed on a commercial basis so that they may be welded to the rails. This not only effects economy but also increases the safety of the track circuits.

Future developments of signaling will continue along the lines of saving freight train hours and stoppages to trains, in that means will be provided for the handling of the trains by signal indication and remote switches will be placed under the control of the leverman and operated from the nearest interlocking or nearest station. Light signals will be used more than they have been in the past, as each year shows an increasing use of this type of signal. Automatic train control will receive a large share of attention and the tendencies in this connection will be along lines of improvements and standardization as to its use and interchangeability on different roads.

Railroad Telegraph and Telephone Construction

IN INAUGURATING A SURVEY of the activities in the railroad telegraph and telephone field covering the past year, the *Railway Age* sent out a questionnaire to 198 roads asking for certain data. It is impossible to draw conclusions as to the relative amount of work as compared with that done in other years as this is the first time that an attempt has been made to collect such data. However, basing conclusions on conditions known to have existed in other departments, it would appear safe to assume that the construction work in this department was below normal, although it will require the collection of data for several years before an accurate analysis of this field can be made.

Work Completed

Thirty-seven out of the 198 roads reported telegraph and telephone construction work completed during 1920. Out of a total of 2,645 miles of long distance telephone conversation circuits, the two largest installations were made by the Pennsylvania System on which 1,014.9 miles was completed in the central region, and the New York, New Haven & Hartford, which completed 600 miles. The Virginian installed 340 miles. The Missouri, Kansas & Texas completed 266 miles of long distance phantom telephone circuits. A total of 820 miles of No. 8 gage iron wire was installed by all roads as compared with 69 miles of No. 9 and 409 miles of No. 6, while 10 miles of No. 8 gage and 430 miles of No. 10 gage copper were installed as compared with 5,421 miles of other gage copper wire.

A total of 15 metallic train despatching circuits were installed while 31 long distance physical telephone and 11 phantom circuits were completed. One road, the Union Pacific, reports the completion of three telegraph circuits for printing telegraph. Sixty-seven way station offices were opened, 50 of which were on the Atchison, Topeka & Santa Fe.

But little overhead or underground cable work was done during the year, a total of 29.3 miles of overhead and 14.8 miles of underground cable being installed. Out of a total of 53 miles of railroad pole line constructed, the Pennsylvania System, central region, installed 34 miles and the Louisville & Nashville 12 miles.

Work Under Construction

Eighteen roads of the 198 reported work as under construction on December 31, 1920. There were 674 miles of long distance telephone conversation circuits reported under construction, of which 341 miles were on the Northern Pacific and 295 on the Pennsylvania System, central region. A total of 577 miles of No. 8 iron is under construction as compared with a mileage of 84 No. 9 gage and 417 No. 6 gage, while

179 miles No. 8 gage copper is being erected on the Union Pacific and 254 miles No. 10 gage on the central region of the Pennsylvania System as compared with 760 miles of other gage copper on all roads reporting.

A total of 13 metallic train despatching circuits are under construction, 12 being in the central region of the Pennsylvania, while a total of 11 physical and 6 phantom circuits is being put in by the various roads. Of the total of 18.3 miles of overhead cable going in, the Great Northern is installing 12.3 miles and the New York, New Haven & Hartford 5 miles. Out of a total of 6.2 miles of underground cable being put in, the N. Y., N. H. & H. is installing 4 miles. Of the 36 miles of railroad pole line under construction, 24.5 miles are being built on the Pennsylvania System, central region. This system is also installing 14 simplex circuits, one composite, seven physical and five phantom circuits. The Union Pacific has three printer circuits under construction.

Work Contemplated

Twenty-six roads report work contemplated in 1921. A mileage of 7,139 long distance telephone conversation circuits is under consideration on these roads, the quoted mileage being 4,935 on the Pennsylvania System. Of a total of all iron wire to be installed, 760 miles of No. 8 gage, 230 miles of No. 9 gage and 235 miles of No. 6 is contemplated, while 2,324 miles of No. 8 gage copper, 479 miles of No. 10 gage and 9,665 of other gages are to be put in.

A total of 17 metallic train despatching circuits having a mileage of 2,098 is expected to be built during the coming year. Forty-six physical and 19 phantom circuits are in contemplation for this year, while the Gulf & Ship Island expects to install 306 miles of grounded telephone circuits and other roads 122 miles of metallic yard circuits. The construction of 53 miles of railroad pole line is at present under consideration and considerable cable work is contemplated, there being a total of 62 miles of overhead cable and 58 miles of underground cable to be installed. The N. Y., N. H. & H. contemplates the installation of 10 printer circuits and the Union Pacific one; and the Pennsylvania contemplates putting in eight duplex circuits. The Denver & Rio Grande has 210 road miles (2 wires) metallic telephone despatching circuits awaiting authority for installation on the Third division narrow gage line between Salida, Colo., and Grand Junction. The reconstruction of the pole line on this section by the Western Union Telegraph Company is also under contemplation.

The Attitude of Investors Toward Railroad Securities

(*Continued from page* 56)

considerably lower than has been the case for many months net earnings will not touch favorable levels. In the meantime, however, it is expected that the carriers will make material decreases in their expenses. They have already decreased their working forces. The decreased costs of supplies will have their effect and this is especially true of fuel which has dropped considerably and is expected to drop much further. The general result will be that when business does pick up again, as it is hoped it will in the late spring or early summer, the carriers should be able to show net earnings on a better scale than the September or October results indicated.

In the first 10 months of 1920 the carriers financed, exclusive of the proceeds granted them from the revolving fund, about $338,304,000, including refunding issues. Their needs for refunding for 1921 are estimated at $446,000,000. For additions and betterments the amounts needed in 1921 are variously estimated, although the authorities seem to agree that something like $1,000,000,000 will be required. The question that arises, of course, is as to the possibilities of the carriers being able to finance these large amounts. It is the general opinion that the recession in the stock and bond market has ended and that from now on conditions should be much easier. It seems unlikely, however, that conditions will improve sufficiently in 1921 to permit of very much financing through stock issues.

Conditions as to bonds seem much better. It is thought that there will be a gradual reduction in interest rates in the course of the year. We can apparently expect also a more receptive bond market, in which case railway issues should be in what amounts practically to a preferred position as compared with industrial issues, and possibly even with government bonds. We have mentioned the increasing popularity of railroad bonds and there can be no doubt that this popularity and increased confidence in railway shares will show its effect in railway financing. The popularity of short term equipment trust issues has already been commented upon; it might be added that the plan of equipment financing worked out by the National Railway Service Corporation should prove of material assistance.

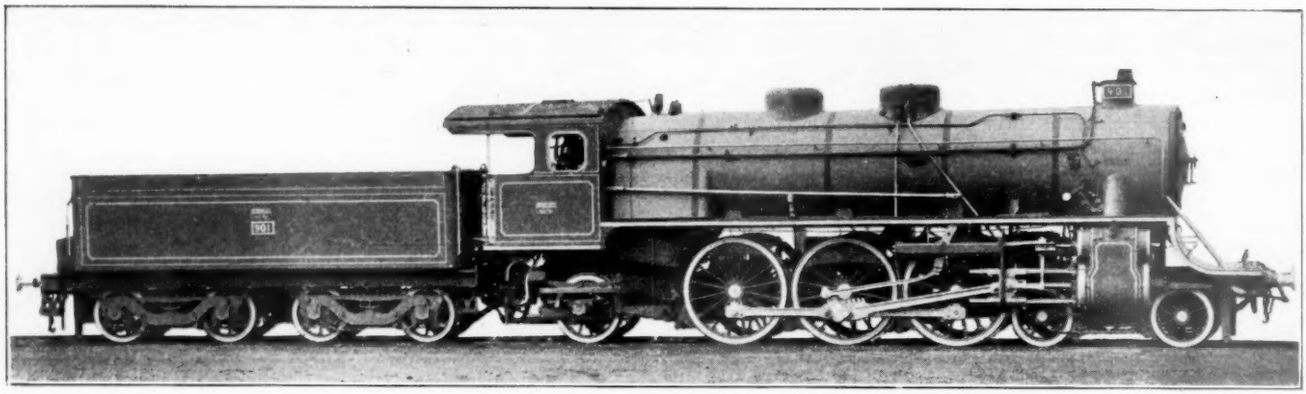
There is a certain drawback in the fact that so much financing will have to be in the form of funded debt and comparatively little in stock. This, in the minds of some, is encouraged by the strong guarantees given railway funded debt in the Transportation Act and in the manner in which the Interstate Commerce Commission has used the $300,000,000 revolving fund for assisting the carriers in meeting their maturing indebtedness. No one could say that the commission has it in mind to protect bondholders as against stockholders. It happens to be the situation nevertheless and the remedy, it is feared, will not be in sight in satisfactory degree during 1921.

This brings us to the question of the progress that will probably be made as to consolidations during the coming few months. The commission is now engaged in working out the suggestions it is required to make under the terms of the Transportation Act.

The law says:

> The commission shall as soon as practicable prepare and adopt a plan for the consolidation of the railway properties of the continental United States into a limited number of systems. In the division of such railways into such systems under such plan, competition shall be preserved as fully as possible and wherever practicable the existing routes and channels of trade and commerce shall be maintained. Subject to the foregoing requirements, the several systems shall be so arranged that the cost of transportation as between competitive systems and as related to the values of the properties through which the service is rendered shall be the same so far as practicable, so that these systems can employ uniform rates in the movement of competitive traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties.

Bearing in mind that these consolidations are voluntary and that the act also withdraws handicaps to consolidations that carriers may have desired to work out in the past, it is very evident that from this point of view 1921 should prove a most interesting year. It is likely that if the commission makes sufficient progress the roads suggested for consolidation will see a speculative movement in their stocks that will be something of an exception from the past few years. The excitement that has already been evidenced in the cases of the large crop of rumors of consolidation proves that conclusively. While speculative movements in stocks are never desirable, it is nevertheless true that they do serve to increase popularity in the stocks concerned and related issues. Observers have sufficient confidence in the Interstate Commerce Commission to believe that the situation will be kept from getting out of hand.



One of the Locomotives Shipped to Spain by the American Locomotive Company in 1920

Railway Supply Exports Show Marked Decline

Adverse Conditions of Exchange and Credit Bring About a Temporary Lull in the Export Showings

THE EXPORTS of railway materials during the first ten months of 1920 fell short enough of the totals for the year 1919 to make it safe to predict that the exports for the whole year, the figures for which are not as yet available, will show a considerable decline from the 1919 totals, except in the case of steam and electric locomotives, where an increase will probably be shown. Taking freight cars as a case in point, it will be noted that the exports for 1919 were 27,317, valued at $57,473,824, while the figures for the first ten months in 1920 give these totals as 18,932 and $32,831,303. The year 1919 was a banner year for exports of railway materials, however, and the figures for that year are the only annual totals which exceed the exports of freight cars for the first ten months only in 1920. Much the same situation obtains as regards the other articles of export, i.e., the 1920 shipments, generally speaking, were less than those of 1919, but greater than those of any previous year.

It had been hoped in this country that the heavy export trade which American equipment manufacturers enjoyed in 1919 could be made permanent. Several conditions have arisen during the past year, however, which make the immediate fulfillment of this hope at least somewhat doubtful. The larger part of the shipments in 1919 were the results of orders placed in 1918 or in the early part of 1919. At that time the equipment manufacturers in other countries were either devoting a large part of their production to war materials or had not yet placed their plants on a peace time basis to an extent where they could handle the orders of their own countries, and it was practically impossible for them to make immediate foreign deliveries. Under such circumstances American manufacturers were practically without competition and sold their wares in almost every country where a market existed.

Conditions have changed somewhat during the past year. Manufacturers in foreign countries were able during 1919 and 1920 to resume production in increasing quantities. At first their factories were so disorganized that their costs of production were very high and American concerns could in most cases underbid their quotations. The situation for them in this regard has, however, steadily improved with the gradual return of pre-war efficiency. On the side of the foreign manufacturers and working in their behalf is the heavy premium on the American dollar which is practically world-wide and in many countries so high that purchases in America are all but prohibitive. Under such circumstances our equipment builders have found it increasingly difficult to compete in prices with foreign manufacturers. The result is that fewer orders have been placed in this country and more are going to foreign concerns.

Another factor which has gone a long way in retarding purchases of railway materials in most countries is the impoverished condition of the greater part of the world as a result of heavy expenditures during the war. Most foreign roads have been in the position in which some of our own have found themselves—in actual need of great quantities of equipment but unable to finance the purchase of it.

The prospects for an early return to heavy exports of railway materials like those of 1919 do not appear as bright as might be wished. In the first place, the credit of the purchasers of this material must be restored so that they can make more purchases. Secondly, the rate of exchange must change so that foreign firms will not find it easy to underbid American manufacturers on account of it. Finally, the labor and raw material which go into the finished product must cost the American manufacturer no more than they do his foreign competitor. Labor costs per unit manufactured can be equalized in two ways: (1) by the same wage scale in America as in Europe or (2) by increased efficiency of American labor to the point where the labor cost per unit is the same as in Europe.

It does not seem at present that the buying power of foreign railways will greatly increase in the near future, nor is there any indication of an early return of the exchange rate to par. The securing of a reasonable cost of manufacture lies largely with the American manufacturers and their employees.

The *Railway Age* publishes each month the exports of railway materials as compiled by the Division of Foreign and Domestic Commerce. These interesting figures give an accurate account of materials shipped month by month with the value and destination. For purposes of comparison these reports have been summarized here.

Steam Locomotive Exports

The totals of exports of steam locomotives for each of the ten months to October have been compiled in Table I. It will be observed that from January 1 to October 31, 1920, 1,426 steam locomotives valued at $45,227,046 were shipped.

By comparing these figures with those for other years, it will be noted that the exports of steam locomotives for 10 months in 1920 have exceeded in value, and approach in number, the totals for any previous year. From this it may be deduced that 1920, with two more months yet to be reported, bids fair to exceed the previous years in the number of locomotives exported. It may be well to note here that the increase in value is due not alone to increased prices, but also to the increasing size and power of the locomotives which are being ordered each year from abroad.

TABLE I—EXPORTS OF STEAM LOCOMOTIVES

Month	Number	Value
January	146	$4,159,214
February	132	4,588,074
March	125	3,672,579
April	157	4,449,736
May	152	5,906,046
June	163	4,284,348
July	134	4,742,306
August	125	5,424,588
September	154	4,105,405
October	138	3,894,750
Total for ten months of 1920	1,426	$45,227,046

Comparison with Previous Years (Entire 12 Months)

Fiscal Year—	Number	Value
1914	383	$3,692,225
1915	228	2,115,866
1916	799	12,665,877
1917	1,442	18,243,248
1918	1,457	35,889,632
Calendar Year—		
1918	1,062	27,064,042
1919	959	30,275,728

Exports of Cars

In the case of cars the showing for 1920 is not so promising. The figures for the first ten months as shown in Table II give a total of 89 passenger cars exported valued at $885,923. These figures are somewhat under the total for the year 1919 and it is doubtful if the exports for November and December will be large enough to offset them. The freight car situation affords even less hope of equaling even the 1919 figures. During the first ten months of the year 18,932 cars valued at $32,831,303 were shipped. These figures fall far below the 1919 totals. Cuba was the destination of a large share of this equipment.

TABLE II—EXPORTS OF CARS FOR STEAM RAILWAYS

	Passenger		Freight and other	
Month	No.	Value	No.	Value
January	16	$205,811	1,724	$3,032,309
February	6	83,365	1,986	3,574,366
March	8	103,474	1,649	2,489,531
April	17	232,224	2,761	5,382,961
May	14	110,798	1,884	3,789,237
June	2	25,851	945	1,031,798
July	1	45,000	2,575	4,825,290
August	..	.....	2,643	4,181,391
September	3	5,900	1,838	3,061,817
October	22	73,500	927	1,462,603
Total for 10 months, 1920	89	$885,923	18,932	$32,831,303

Comparison with Previous Years (Entire 12 Months)

	Passenger		Freight and other	
Fiscal Year—	No.	Value	No.	Value
1914	..	$2,018,853	.....	$5,390,705
1915	..	509,024	.....	1,198,806
1916	..	820,518	.....	23,298,759
1917	..	815,791	.....	26,769,793
1918	75	228,698	10,303	18,821,936
Calendar Year—				
1918	98	883,607	8,050	11,522,608
1919	104	1,606,540	27,317	57,473,824

TABLE III—EXPORTS OF CAR WHEELS AND AXLES

Month	Value	Month	Value
January	$652,251	July	$1,476,881
February	1,217,199	August	469,413
March	789,265	September	846,198
April	593,394	October	543,753
May	756,027		
June	346,100	Total 10 mos. 1920	$7,690,481

Comparison with Previous Years (Entire 12 Months)

(Car Wheels Only Prior to 1918)

Fiscal year	No.	Value
1914	49,360	$414,371
1915	20,985	183,290
1916	59,950	741,542
1917	88,381	2,385,973
1918	.....	5,220,704
Calendar year		
1918		6,889,084
1919		11,843,738

Track Materials

The exports of railway track materials are shown in Table IV. Here the decline in shipments from 1919 has been great enough to be little short of remarkable. In point of quantity the figures in all cases give the shipments for the first ten months of 1920 at little more than half those for 1919. Spikes weighing 30,046,451 pounds and valued at $1,289,195; steel rails weighing 474,599 tons valued at $28,922,669; and miscellaneous material valued at $5,430,490 complete the totals for the ten months. While the showing is very unfavorable when compared with the peak year, 1919, the indications are that the full year 1920 will give totals as great, and in most cases greater, than any other year for exports of this material. The weight and value of shipments of spikes and rails have in the ten months exceeded the figures for any other year excepting 1919. Cuba and Japan were the destinations of large consignments of track material.

TABLE IV—EXPORTS OF RAILWAY TRACK MATERIAL

	Spikes		Steel rails		Switches, frogs, splice bars, etc.
Month	Pounds	Dollars	Tons	Dollars	Dollars
January	1,653,569	61,372	44,449	2,602,916	237,178
February	2,787,036	117,130	31,241	1,724,970	411,538
March	4,014,009	163,337	51,763	2,940,117	557,189
April	3,913,937	178,925	46,564	2,713,080	726,403
May	3,072,767	137,087	58,497	3,434,893	582,278
June	3,651,759	165,649	49,620	3,080,619	556,959
July	2,845,462	123,574	51,869	3,329,530	735,726
August	2,699,131	114,213	56,160	3,661,174	566,710
September	1,874,136	85,297	31,170	2,008,699	366,724
October	3,534,645	142,611	53,266	3,426,671	689,785
Total for 10 months, 1920	30,046,451	1,289,195	474,599	28,922,669	5,430,490

Comparison with Previous Years (Entire 12 Months)

	Spikes		Steel rails		Switches, frogs, splice bars, etc.
Fiscal Year—	Pounds	Dollars	Tons	Dollars	Dollars
1914	19,564,618	346,034	338,613	10,259,109	2,534,148
1915	12,289,203	203,663	159,587	4,537,978	2,407,490
1916	59,145,818	1,398,514	537,918	17,631,756	5,261,944
1917	42,809,961	1,502,430	594,389	25,405,469	9,108,617
1918	34,832,142	1,722,922	430,347	22,817,400	6,286,369
Calendar Year—					
1918	22,330,104	1,229,083	453,537	26,402,864	5,582,860
1919	55,487,231	2,896,073	652,443	38,986,855	9,280,725

Table V shows the exports of electric locomotives which during 1920 will probably equal the 1919 figure in point of number and possibly that of the banner year for export of electric locomotives, 1917, when 73 were shipped. In point of value the shipments for the first ten months of 1920 have already exceeded those of any previous year.

TABLE V—EXPORTS OF ELECTRIC LOCOMOTIVES

Fiscal year	No.	Dollars
1914	48	$437,452
1915	43	324,478
1916	62	452,324
1917	73	563,350
1918	39	161,453
Calendar year		
1918	47	183,200
1919	68	835,978
1920 (first 10 mos.)	60	861,580

General News Department

The New York Section of the Signal Division of the American Railroad Association will hold its next meeting on Thursday evening, January 20, at the Hotel McAlpin, Sixth avenue and 34th street, New York City. Louis F. Vieillard, electrical inspector, Long Island Railroad, will present a paper on A. C. track circuits. Men on steam roads using A. C. track circuits are particularly invited to attend and to relate their experience with A. C. compared with D. C. track circuits.

A station, properly equipped, and attended by an agent, must be maintained, in Canada, at every place where the average railroad earnings have been not less than $15,000 a year. This is in accordance with general order No. 54 of the Railway Commission. The commission has received an application, on behalf of the railroads, for an order amending No. 54 so as to make the limit $25,000, of which $4,000 must be on inward traffic. The application is made on the ground that the cost of maintenance of agency stations has more than doubled; and that the rule, if not changed, will require the maintenance of stations at points where there is but a small volume of business.

Wood Preservers' and Tie Producers' Associations Meet in San Francisco

The American Wood Preservers' Association will hold its seventeenth annual convention at the St. Francis Hotel, San Francisco, Cal., on January 25, 26 and 27. The National Association of Railroad Tie Producers will hold its third annual convention at the same hotel on January 27 and 28. The programs for these two conventions have been completed and are published in abstract below.

In view of the increasing use of western timber throughout the central and eastern states, members of these associations are taking advantage of the opportunity to make first-hand study of lumber conditions in those areas. Special cars will leave Chicago on January 15, with connecting cars from St. Louis and Kansas City, arriving at Seattle, January 19, where four days will be spent in studying the timber resources and methods of producing lumber in the northwest. The party will arrive at San Francisco Tuesday morning, January 25, prior to the opening of the Wood Preservers' convention.

WOOD PRESERVERS' PROGRAM

Tuesday Morning.

Opening business.

Tuesday Afternoon.

Report of Committee on Preservatives.
Paper on Cresoil, by R. G. Smith.
Report of Committee on Utilization and Service.
Report of Committee on Track.
Paper on Selection and Treatment of Douglas Fir Ties, by A. C. Pestel.
Report of Committee on Flooring and Paving.

Wednesday Morning.

Report of Committee on Treatment.
Report of Committees on Fir Ties and Blocks.
Paper on Treated Lumber in Insulating Roofs of Moist Factories, by F. J. Hoxie.
Paper on History of Wood Pipe and Some Data on Its Use, by E. F. Bartells.

Wednesday Afternoon.

Paper on Experiments with Butt Treated Poles in California, by P. R. Hicks.
Paper on Perforated Butt Treated Poles, by W. M. Leavitt.
Paper on Wood Preservation as a Conservative Policy, by Walter Buehler.
Paper on Description of Process Used to Treat Pile Butts in Place, by E. F. Hartman.

Thursday Morning.

Report of Committees on Pressure and Non-Pressure Treatment of Poles.

TIE PRODUCERS' PROGRAM

Thursday Afternoon.

Convention opens at 1:30 p. m.
Address by Edmund W. Blake, president.
Report of Committee on Specifications, dealing principally with the specifications and inspection rules proposed by the Tie Committee of the American Railway Engineering Association for adoption by that association. These specifications will be discussed with reference to yellow pine ties by R. E. McKee, The Long-Bell Lumber Company; white and red oak ties by Walter Poleman, The Western Tie & Timber Company; redwood ties by H. M. Cochran, The Union Lumber Company; Douglas fir ties by R. L. France, The Southern Pacific; ties manufactured from Rocky Mountain timber by B. Coldren, The Hallack & Howard Lumber Company, and ties manufactured from cedar and northern hardwoods, by Benjamin Finch, of Finch Brothers.

Friday Morning.

Reports on tie production from the 11 tie producing districts of the association.
The Relation Between the Tie Producers, Treating Plants and the Railroads, by R. A. Calvin, The Kettle River Company.
The Various Factors Entering into the Cost of Delivered Cross Ties, Both to Producing and Non-Producing Roads, by Howard Andrews, The Nashville Tie Company.
The Function and Necessity of the Small Mill in Tie Production, by J. S. McCladry, the Bohemia Lumber Company.

Friday Afternoon.

The Use of Mechanical Power in the Production of Cross Ties, by R. J. Witherell, of L. D. Leach & Co.
The Timber Resources of the United States with Special Reference to the Pacific Coast, by C. L. Hill, in charge of office of Forest Products, California district, U. S. Forest Service.
The Tie Supply of the Future, by John Foley, forester, Pennsylvania Railroad.
The Effect of Increased Costs of Cross Tie Renewals upon Permissible First Cost of Ties in the Track, by R. H. Howard, chief engineer maintenance of way, Wabash Railway.
The Economics of Railroad Tie Purchasing, by E. E. Pershall, T. J. Moss Tie Company.
Open discussion standardized specifications and inspection and action upon them by the association.

On Saturday a special train will carry the members of the two associations and their guests into the redwood forest near Santa Cruz, Cal.

Central Railway Club

The next meeting of the club will be held on Thursday evening, January 13, at Hotel Iroquois, Buffalo, N. Y. There will be an exhibition of moving pictures showing the manufacturing methods of the Eddystone plant of the Baldwin Locomotive Works, with an explanatory address by A. H. Ehle, general sales manager. Officers for the new year will be installed.

Program of the Annual Meeting of the A. S. C. E.

The following is a summary of the meetings and excursions planned for the 68th Annual Meeting of the American Society of Civil Engineers to be held at the headquarters of the society at 33 West Thirty-ninth street, New York, on January 19 and 20, 1921:

Wednesday, January 19.

10 a. m.—Business meeting.
1.15 p. m.—Luncheon.
2:30 p. m.—For the benefit of the society's guests, as well as for its members in case the business meeting does not continue through the afternoon, arrangements have been made whereby those who desire may have the choice of visiting any or all of the following places of interest:

(1) Experimental laboratories, Western Electric Company.
(2) Surveying and Engineering Instrument Factories of Keuffel & Esser Company, Hoboken.
(3) Fox Film Corporation Motion Picture Studios and Laboratories.
(4) New buildings under construction for Fletcher's Castoria Company and Western Electric Company.
(5) Long Distance Telephone Exchange, American Telephone and Telegraph Company.

9 p. m.—President's reception, followed by dancing.

Thursday, January 20.

9:45 a. m.—Excursion to Long Island City.

1 p. m.—Luncheon, Metropolitan Life Insurance Company Building (Manhattan).

2:30 p. m.—Address by President, Metropolitan Life Insurance Company.

3-4:30 p. m.—Inspection of "Human Engineering" Work and the buildings of the Metropolitan Life Insurance Company.

8:30 p. m.—Address and informal smoker.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago. Next meeting June 20, 1921.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, C. & E. I. R. R., 332 South Michigan Ave., Chicago.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, 75 Church St., New York. Next regular meeting, November, 1921.

Division 1, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Fripp (chairman), General Manager, N. Y. C. R. R., New York, N. Y.

Telegraph and Telephone Section.—H. Hulatt (chairman), Manager of Telegraphs, Grand Trunk. Exhibit by Railway Telegraph and Telephone Appliance Association.

Division 2, Transportation (including former activities of Association of Transportation and Car Accounting Officers).—E. J. Pearson (chairman), President, N. Y., N. H. & H. R. R., New Haven, Conn.

Division 3, Traffic.—Robert C. Wright (chairman), General Traffic Manager, P. R. R., Philadelphia, Pa.

Division 4, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 15-17, 1921, Chicago.

Construction and Maintenance Section.—E. H. Fritch, secretary.

Electrical Section.—George Gibbs (chairman), Chief Engineer of Electric Traction, Long Island Railroad, New York, N. Y.

Signal Section.—H. S. Balliet, 75 Church St., New York. Exhibit by Signal Appliance Association.

Division 5, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention June 15-22. Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section.—V. R. Hawthorne, secretary.

Division 6, Purchases and Stores (including former activities of Railway Storekeepers' Association).—J. P. Murphy, General Storekeeper, N. Y. C. R. R., Collinwood, Ohio. Second annual meeting, June 20-22, 1921, Atlantic City, N. J.

Division 7, Freight Claims (including former activities of the Freight Claim Association).—Lews Pilcher, 431 South Dearborn St., Chicago.

Division 8, Perishable Freight.—E. F. McPike (chairman), 431 South Dearborn St., Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention in New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 15-17, 1921, Chicago. Exhibit by National Railway Appliance Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col. H. S. Crocker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Annual meeting, January 19-20, 1921, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN STEEL TREATERS' SOCIETY.—W. H. Eisenman, 154 East Erie St., Chicago.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, January 25-27, 1921, San Francisco.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting at St. Louis, Mo.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—C. L. Mellor, 212 W. Illinois St., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 131 Charron St., Montreal, Que. Next meeting, December 14.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—W. P. Elliott, Terminal R. R. Ass'n of St. L., East St. Louis, Mo.

CINCINNATI RAILWAY CLUB.—H. Boutet, 101 Carew Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—D. G. Stuart, Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention October 4-6, 1921, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next convention, May 23-26, 1921, Planters' Hotel, St. Louis, Mo.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—(See American Railway Association, Division 5, Equipment Painting Section.)

MASTER CAR BUILDERS' ASSOCIATION.—(See American Railway Association, Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo. Next annual convention, January 27-28, 1921, San Francisco.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 30th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See American Railway Association, Division 4, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See American Railway Association, Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with American Railway Association, Division 5.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. I. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Schroeder Headlight & Generator Co., New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.

Traffic News

The Gulf Coast Lines announce that, beginning February 1, a sleeping car will be run regularly between Houston, Texas, and Tampico, Mexico, via Brownsville and Matamoras.

The Supreme Court of New York, at Kingston, has authorized the reopening of the case in which the Court of Appeals recently decided that the New York Central must carry way passengers between Albany and Buffalo at the rate of 2 cents a mile, notwithstanding the order of the Interstate Commerce Commission prescribing a higher rate.

The Interstate Commerce Commission has vacated and set aside as of December 31 its Service Order No. 1 issued on May 20, which authorized and directed railroads to route freight regardless of the routing instructions of shippers or of connecting lines, to relieve congestion, and also its Service Order No. 13 issued on August 24, authorizing carriers to unload cars of grain at Galveston. The emergency which caused the issuance of these orders has been measurably relieved.

The Southern Pacific announces that the Sunset Route via New Orleans has been reopened for through passenger travel on the basis of fares applying over other routes, to and from the eastern and northern territory served by the Sunset Route for 37 years prior to the closing of the New Orleans gateway in October, 1919, by the Railroad Administration. This means that from Chicago, Louisville, Cincinnati and points east thereof, to all points in California, the fares are now as low through New Orleans as those over the other lines.

The Traffic and Transportation Association, of Pittsburgh, Pa., held its election of officers on December 10. S. R. Hosmer, of the Jones & Laughlin Steel Company, was elected president; H. A. Dietz, of the Delaware & Hudson, vice-president; George E. Gree, of the Union Pacific, treasurer; R. F. Heil, of the Guth Refining Company, recording secretary; F. E. Wolfe, of the Atchison, Topeka & Santa Fe, financial secretary; and H. L. Geyer, of the Carnegie Steel Company, custodian. H. A. Cochran, of the A. M. Byers Company, was elected chairman of the executive committee; E. A. Hynes, of the Chicago & Alton; W. H. Spilker, of the Pittsburgh Terminal Warehouse & Transfer Company; A. C. Schweitzer, of the Tonnage Steel Company, and H. A. Dietz are the other members.

Coal Production

Production of soft coal decreased during the week ended December 25, not only because of the Christmas holiday but also because of a smaller rate of output per working day. The total production is estimated at 9,725,000 net tons. Cumulative production for the calendar year to December 25, amounted to 547,264,000 net tons. If the rate of production be continued during the five remaining days of the year, the total output will be 556,000,000 tons. Production during the first 303 working days of the year was over 1,000,000 tons greater than that for 1917, but 25,000,000 tons less than that for 1918, although 97,000,000 tons greater than that for 1919.

Equipment and Supplies

Locomotives

THE FLORIDA EAST COAST is asking for prices on 5 switching and 10 Pacific type locomotives.

THE INTERNATIONAL & GREAT NORTHERN is inquiring for 4 Mikado and 4 switching locomotives.

Freight Cars

THE JERRY MUGIVAN CIRCUS interests, Peru, Ind., are inquiring for 20 flat cars of 30-ton capacity.

THE SOUTH AFRICAN RAILWAYS are inquiring through their London, Eng., office for 200 gondola cars.

THE UNITED FRUIT COMPANY, Pier 9, North river, New York, is inquiring for 40 box cars and 40 flat cars of 16 tons capacity.

MITSUI & Co., 65 Broadway, New York, has ordered from the Kilbourne & Jacobs Manufacturing Co., 50 air dump cars for the Japanese Government, to be used in Formosa.

Passenger Cars

THE FLORIDA EAST COAST is asking for prices on 6 passenger cars.

THE DEPARTMENT OF CITY TRANSIT, Philadelphia, Pa., William S. Twining, director, is asking for bids until January 25, for from 50 to 100 steel passenger car bodies for steel passenger cars, for elevated and subway service and for from 54 to 104 motor trucks.

Iron and Steel

THE SOUTHERN RAILWAY has ordered 5,000 tons of rails from the United States Steel Corporation.

THE BALTIMORE & OHIO has ordered 15,000 tons of rails from the United States Steel Corporation.

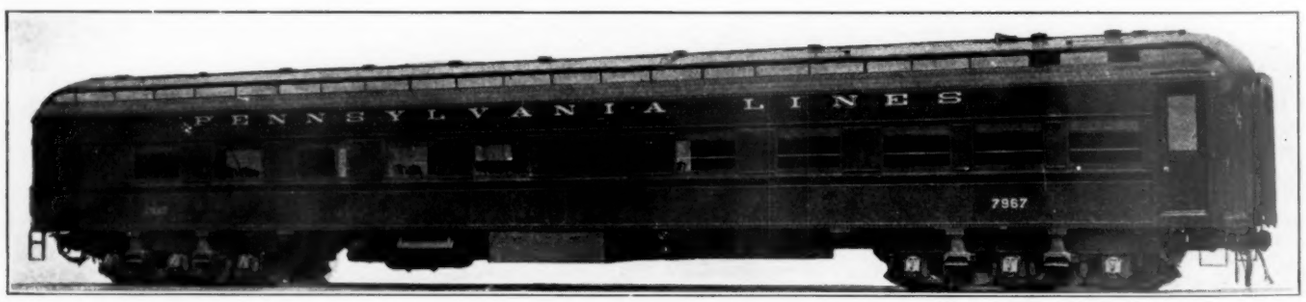
THE ATCHISON, TOPEKA & SANTA FE has ordered 40,000 tons of rails from the United States Steel Corporation.

THE CHICAGO UNION STATION COMPANY has ordered 700 tons of structural steel from the Bethlehem Steel Company for use in the construction of the Van Buren street viaduct, Chicago.

THE NEW YORK, CHICAGO & ST. LOUIS has placed an order for 3,000 tons of open-hearth rails, for 1921 delivery, with the Carnegie Steel Company, increasing its order from this producer to 9,000 tons.

Miscellaneous

MITSUI & Co., 65 Broadway, New York, has ordered 3,200 couplers from the National Malleable Castings Company, to be used on the Japanese Government railways.



Supply Trade News

Emanuel Woodings has been elected vice-president of the Verona Tool Works, Pittsburgh, Pa. Mr. Woodings has been connected with the company 33 years.

A. G. Shaver, chief engineer of the **Regan Safety Devices Company, Inc.,** Chicago, has been in England and has made a tour of the Continent, making a study of train control conditions there.

The Du Pont Fabrikoid Company, Inc., Wilmington, Del., announces that its entire business has been sold to E. I. Du Pont De Nemours & Co., Inc., also of Wilmington, and is now operated as the Fabrikoid division of that company.

Howard H. Marsh, for nearly eight years district manager of the *Railway Age* and the other publications of the Simmons-Boardman Publishing Company at Cleveland, Ohio, has resigned to become president of the **Victory Equipment Company,** with office at 444 Maison Blanche Annex, New Orleans, La. As head of the Victory Equipment Company, he will handle the following accounts: McMyler-Interstate Company, Cleveland, locomotive cranes, pile drivers and material handling equipment; Ball Engine Company, Erie, Pa., steam shovels and railroad ditchers; Schaefer Equipment Company, Pittsburgh, Pa., truck lever connections, brake levers, brake rod jaws and stake pockets; and Equipment Manufacturing Company, Cleveland, trucks and trailers. His education, business experience and wide acquaintance fit Mr. Marsh for his new undertaking. He is still a young man, having graduated at the University of Vermont in 1903, with the degree of B. S. in civil engineering. That same year he entered the employ of Engineering News (now Engineering News-Record) as assistant to the western manager, and stayed there until 1907, when he was appointed western representative of Engineering & Contracting, with headquarters in Chicago. He left the latter place to go to Cleveland as district manager of the Simmons-Boardman Publishing Company. Mr. Marsh's removal to New Orleans is due to his desire to be near his family, as it was necessary for Mrs. Marsh to take up her residence in the southwest in order that her health might be restored. In addition to his other work, Mr. Marsh will represent the Simmons-Boardman Publishing Company in the southwestern territory.

H. H. Marsh

W. H. Darrah, sales representative for the Upson Nut Company, and the Bourne-Fuller Company, of Cleveland, Ohio, and Chicago, is now connected with the **Michigan Bolt & Nut Works of Detroit, Mich.,** as sales representative in the Chicago territory.

George S. Bigelow, formerly manager of the railway department of the Chicago Varnish Company, is now in charge of the railway department of the **Mountain Varnish & Color Works, Inc.,** of Toledo, Ohio, with offices in the Railway Exchange Building, Chicago.

John B. Zymour, formerly with the National Lock Washer Company, Newark, N. J., has been appointed manager of the sales department of the **Verona Tool Works,** Pittsburgh, Pa., with headquarters at Chicago, succeeding Howard C. Mull, who has resigned to go to another company, as noted in the *Railway Age* of December 31.

William S. Boyce, for a number of years connected with The Rail Joint Company, New York, has been appointed western manager of sales for the **Lundie Engineering Corporation** with headquarters at 30 North La Salle street, Chicago, Ill.

Harry B. Stafford, who has opened an office as consulting industrial labor administrator in the Hudson Terminal, 30 Church street, New York, as noted in these columns last week, was formerly for some three years major in the Construction Division of the United States Army, instead of manager, as incorrectly stated.

F. Lavis will resume his independent practice as consulting engineer at 120 Broadway, New York City, specializing in transportation developments and especially in those relating to foreign countries. He has been retained by the American International Corporation, New York, with which he has been associated since its inception.

John S. Lemley, for five years general sales agent of the G. F. Cottor Supply Company, Houston, Tex., and later associated with William D. Jenkins, dealer in railway supplies, St. Louis, Mo., has been appointed sales representative for southeastern territory for **Harry Vissering & Co.,** the **Okadee Company,** Chicago, and the **Charles R. Long, Jr., Company,** Chicago, effective January 1.

Lima Locomotive Works Changes

Lewis A. Larsen, assistant to the president of the Lima Locomotive Works, Inc., has been elected vice-president and **Waldo H. Marshall** has been elected a director.

L. A. Larsen

Mr. Marshall was formerly president of the American Locomotive Company and later resigned to go with J. P. Morgan & Co.

Mr. Larsen was born at Ridgeway, Ia., in 1875. He received his early education in the public schools of Ridgeway and Decorah, Ia., and Upper Iowa University, Northwestern University and St. Paul College of Law. In November, 1897, he entered the service of the Chicago Great Western as clerk to the master mechanic. He held successively the position of chief clerk to the superintendent of motive power and chief clerk to the assistant general manager. In 1904 he resigned to accept the position of chief clerk to the superintendent of motive power of the Northern Pacific at St. Paul. In November, 1906, he became associated with W. H. S. Wright, railway supplies, representing the Railway Steel Spring Company, the Pittsburgh Forge & Iron Company and other companies, and in 1907 entered the service of the American Locomotive Company. In 1909 he was appointed assistant to the vice-president in charge of manufacturing, and July, 1917, was appointed assistant controller. For several years previous to 1917 Mr. Larsen was a special lecturer in the Alexander Hamilton Institute, New York. He has also contributed a number of papers to the railroad magazines. In December, 1917, he was appointed assistant to the president of the Lima Locomotive Works.

R. F. Eissler, has been appointed assistant to the vice-president of the **Chicago Pneumatic Tool Company,** New

York, with headquarters in the company's new office building at 6 East Forty-fourth street, New York. **W. C. Straub,** formerly district manager of the New Orleans branch, has been appointed district manager of the Pittsburgh branch to succeed Mr. Eissler, and **Ross Wyeth,** formerly attached to the Pittsburgh branch, has been appointed district manager of the New Orleans branch to succeed Mr. Straub.

On January 1, the general offices of the **Stone Franklin Company** were removed from 18 East Forty-first street, New York, to 6400 Plymouth avenue, St. Louis, Mo. This change brings the office in close connection with its manufacturing plant. In addition to its general offices in St. Louis, the Stone Franklin Company will also maintain a New York office at 30 Church street, in charge of president **Ralph G. Coburn** and vice-president **C. E. Walker. H. D. Rohman,** at present chief engineer of the company, has been appointed vice-president, with office at St. Louis, in addition to his present duties. He will have jurisdiction over sales in the west.

The B. F. Goodrich Rubber Company, Akron, Ohio, on December 31, 1920, celebrated its golden anniversary. The company was incorporated December 31, 1870, by Dr. Benjamin Franklin Goodrich. In a golden anniversary greeting to employees and customers, President B. G. Work said in part: "We feel a thrill of pride as we look back over the years and realize the part we have played in the development of the rubber industry." The Goodrich company commemorated the golden anniversary by publishing an attractive 48-page book called the Golden Year of Goodrich, telling of the romance of the rubber industry, its history, and of what great importance it has been in the progress and development of the world. The book was written by Wilbur D. Nesbit and illustrated by W. T. Benda, the Polish-American painter.

Obituary

WILLIAM ROBINSON

Dr. William Robinson, inventor of the closed track circuit, the distinctive essential element in the automatic block signal system used on all the important railroads of the United States, died at the Muncie Sanitarium, in Brooklyn, N. Y., on Sunday, January 2, at the age of 80. He was born at Cole Island, County Tyrone, Ireland. He was unmarried and had lived in Brooklyn 76 years. He was an inventor in many fields and is credited with an electric welding process and the coaster brake for bicycles. He was a fellow of the American Institute of Electrical Engineers and an honorary member of the Signal Division of the American Railroad Association.

Dr. Robinson's experiments with track circuits began more than fifty years ago. He installed a section, open circuit, on the Philadelphia & Erie, now a part of the Pennsylvania, at Kinzua, Pa., in 1870, one of the co-operating railroad officers being the late Theodore N. Ely, afterward chief of motive power of the Pennsylvania Railroad. The closed circuit, which is the chief element in Robinson's fame, was tried on the same road in 1871, and a patent applied for. He took out patents on other features of automatic signaling, but in a list of electric signal patents published by the Union Switch and Signal Company in 1894, Robinson's name appears only once, namely, November 7, 1882, patent number 267,259. Like all other patentees of important inventions, he had to fight long years in the courts for his rights.

In 1876 Robinson went to Boston and his first extensive experiments were made on the Boston & Lowell, the Boston & Providence, and the Old Colony. In 1878 he formed the Union Electric Signal Company, which about two years later was bought by George Westinghouse and became the Union Switch & Signal Company.

To Robinson, inventor of the closed track circuit, and Professor Joseph Henry (1799-1878), inventor of the electromagnet, the world is indebted for one of the most wonderful elements in modern high-speed railroading, the automatic block signal. All of the automatic signals of American railroads depend on these two features.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—This company has declared the regular quarterly dividend of 1½ per cent on its common stock, payable March 1 to stock of record January 28.

BALTIMORE & OHIO.—The Interstate Commerce Commission has authorized this company to nominally issue $7,586,000 of refunding and general mortgage bonds to be held in its treasury and to issue and pledge $362,000 of its Pittsburgh & Lake Erie and West Virginia System refunding 4 per cent gold bonds as additional collateral security for the refunding and general mortgage bonds; also to issue and pledge $1,000 of its Pittsburgh Junction and Middle Division first mortgage bonds as additional collateral security for its Pittsburgh, Lake Erie & West Virginia bonds. Authority was also granted to various subsidiary companies to issue and deliver their bonds to the Baltimore & Ohio Company's nominees in payment for additions, improvements and betterments. Authority was also granted to issue conditional sale purchase notes for the conditional purchase of equipment under the terms of the contract entered into with the National Railway Service Corporation, to assume liability as guarantor in respect of an application of the service corporation to the United States for a loan on account of the equipment, and to pledge $3,250,000 of its refunding and general mortgage bonds as security in part for the performance of obligations under the equipment trust.

BOSTON & MAINE.—This company has been authorized by the Interstate Commerce Commission to issue $609,000 of mortgage bonds dated January 1, 1921, at 7 per cent, to be sold or exchanged for the retirement of bonds of subsidiary companies.

BUFFALO, ROCHESTER & PITTSBURGH.—The Interstate Commerce Commission has approved a loan of $1,000,000 to this company to aid the company in meeting its maturing indebtedness in a total principal amount of $1,987,000. The company itself is required to finance $987,000 to meet the loan of the government.

CAROLINA, CLINCHFIELD & OHIO.—The Interstate Commerce Commission has authorized this company to issue $5,000,000 of 15-year 6 per cent cumulative income debentures dated July 1, 1920, and payable July 1, 1935, the proceeds of which are to be applied to the payment or discharge of outstanding short term notes and expenses and other current indebtedness.

CENTRAL OF GEORGIA.—This company has applied to the Interstate Commerce Commission for authority to issue $650,000 of equipment trust certificates at 7 per cent, representing 55 to 60 per cent of the cost of equipment proposed to be acquired at the cost of $1,066,123. The certificates are to be sold to bankers on a 7½ per cent basis and the balance of the purchase price the company expects to obtain in part from a loan of $237,912 from the United States Government.

CHICAGO & ALTON.—This company has decided not to accept the government's compensation offer of $3,178,314, which represents the road's standard return. The directors asked for $4,592,500 and hold that compensation based simply on standard returns is not sufficient. An appeal will be made to the Court of Claims.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—This company has applied to the Interstate Commerce Commission for authority to issue a promissory note for $1,000,000 to the Chicago & North Western in renewal of an existing note and to repledge as collateral $1,200,000 of its debenture gold bonds maturing 1930.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—This company has been authorized by the Interstate Commerce Commission to assume as lessee of the Cincinnati Southern the obligation of paying as additional rental the interest on $3,500,000 of 5 per cent gold bonds of the City of Cincinnati and of paying annually 1 per cent to provide a sinking fund.

FREDERICKSBURG & NORTHERN.—This company has applied to the Interstate Commerce Commission for a loan of $20,000 from the

government for three years to be used in the purchase of a second-hand locomotive. The company says in its application that the lone engine now possessed is 39 years old and will not last any longer.

ILLINOIS SOUTHERN.—This road, which ceased operations under a court order in December, 1919, has been purchased by W. F. Carter, an attorney of St. Louis, Mo. The road extends from Salem, Ill., to Bismarck, Mo., about 140 miles.

MICHIGAN CENTRAL.—The Interstate Commerce Commission has authorized this company to issue 15 six per cent promissory notes, each for $262,000, to the New York Central for a loan aggregating $3,930,000, the proceeds to be used by applicant in procurement of new equipment, and for additions and betterments to existing equipment; to issue one 10-year six per cent promissory note for $613,000, to the New York Central, the proceeds to be used for additions and betterments to applicant's ways and structures; and to issue $507,000 of six per cent refunding and improvement mortgage bonds, series B, maturing July 1, 1935, and to pledge same with the New York Central as security for the note for $613,000.

In connection with the approval of this application, the commission said:

"While no request for a hearing has been made by any state authority answers containing representations on behalf of the states of Ohio, and Michigan, have been filed by the public utilities commissions thereof, in which dismissal of the application is asked, on the grounds: (1) that as the applicant is a railroad corporation organized and existing under the laws of the state of Michigan, we have no jurisdiction; (2) that the issue of securities by the applicant does not involve a federal question; and (3) that the applicant, not being a federal corporation or creature of the federal government, is not answerable to the federal government in any degree so far as its security issues are concerned. The answer on behalf of Michigan also asserts that said state is financially interested in the issue of securities by the applicant, for the reason that upon such issue being authorized by it, a statutory fee becomes payable to the state of Michigan before the issue or sale of the securities takes place.

"No objection to the granting of the application has been offered by the railroad, public service or utilities commissions, or other authorities of the states of Indiana, Illinois, or New York.

"It is well settled that common carriers by railroad engaged in interstate commerce, although organized and existing as state corporations, are nevertheless subject to our jurisdiction. Paragraph 7 of section 20a provides . . . that a carrier may, under our authority, issue securities and assume obligations or liabilities in accordance with the provisions of said sectoin 20a without securing other approval.

"Paragraph 2 of said section 20a provides that it shall be unlawful for a carrier by railroad to issue securities, even though permitted by the authority creating it, unless and until, and then only to the extent that, we authorize such issue. Any security for the issue of which our authority is required, is void if issued without such authority having been first obtained. Upon consideration of the answers of the public utilities commissions of Ohio and Michigan, we are of opinion that we have jurisdiction."

NEW YORK CENTRAL.—The Interstate Commerce Commission has authorized this company to issue $6,494,000 of refunding and improvement mortgage bonds and to pledge them with the Secretary of the Treasury as security for a loan; also to assume obligations and liabilities in respect to $6,420,000 of 6 per cent equipment trust certificates and to pledge them with the Secretary of the Treasury; also to assume obligations and liabilities as endorser and guarantor for promissory notes to be issued by its subsidiaries to the amount of $18,299,000, also to be pledged with the Secretary of the Treasury as security for a loan. The commission had previously approved the making of two loans to the New York Central and its subsidiaries aggregating $26,775,000.

NEW YORK CENTRAL.—The Interstate Commerce Commission has granted authority to various subsidiaries of the New York Central to issue their promissory notes to New York Central, the proceeds to be used for additions and betterments to roadway and structures, and to equipment.

PEORIA & PEKIN UNION.—This company has applied to the Interstate Commerce Commission for a loan of $1,861,000 to retire bonds maturing on February 1, which the holders have declined to extend.

TENNESSEE CENTRAL.—This company has applied to the Interstate Commerce Commission for a loan of $3,000,000 for the purchase of locomotives, cars, rail and other track material and to pay outstanding obligations. The company proposes to purchase six Mikado locomotives at a cost of $270,000 and 300 coal cars at $3,000 each.

Railway Officers

Executive

Charles Hicks, general manager of the Tennessee, Alabama & Georgia, with headquarters at Chattanooga, Tenn., has been appointed receiver on application made by counsel of the company.

S. Ennes, general manager of the Eastern lines of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been appointed vice-president and general manager of the Wheeling & Lake Erie, with headquarters at Cleveland, Ohio, effective January 1. He succeeds **H. W. McMaster,** who has been granted a temporary leave of absence on account of illness and has been relieved of his duties as general manager but will continue as vice-president.

Financial, Legal and Accounting

A. J. Maxwell, assistant auditor on the Atchison, Topeka & Santa Fe, Coast Lines, with headquarters at Los Angeles, Cal., has been appointed auditor of the subsidiary oil companies of the Santa Fe in California, effective December 15. **C. W. Sowle,** assistant auditor of disbursements, succeeds Mr. Maxwell.

Edward G. Smith, assistant treasurer of the Union Pacific, has been appointed treasurer, succeeding F. V. S. Crosby, deceased. Mr. Smith was born at Buffalo, N. Y., May 11, 1886. He was graduated from the Buffalo Central High School in 1902 and entered the service of the New York Central in 1903 in the office of the division engineer. In 1905 he was transferred to New York City as a clerk in the office of the engineer maintenance of way. In 1907 he left the New York Central to become a clerk in the treasurer's office of the Union Pacific. While working in this capacity Mr. Smith studied law in the New York Law School and received the degree of LL. B. in 1909 from that institution. The following year he received the degree of LL. M. from New York University and was admitted to the New York bar. Mr. Smith remained with the Union Pacific as cashier until December, 1917, when he resigned to enter the building business. In 1919 he again entered the service of the Union Pacific, this time as assistant treasurer, and served in that capacity until the time of his recent promotion.

Operating

J. D. Haydon, superintendent of the Atlanta division of the Louisville & Nashville, with headquarters at Etowah, Tenn., has been transferred to the Eastern division at Ravenna, Ky., succeeding **M. Seargeant.** Mr. Seargeant succeeds Mr. Haydon as superintendent of the Atlanta division.

Andrew Dutton, trainmaster on the Chicago, Milwaukee & St. Paul, with headquarters at Des Moines, Ia., has been transferred to Dubuque, Ia., effective January 1, succeeding R. L. Blakesley, who has been assigned to other duties. The position of trainmaster at Des Moines has been abolished.

A. O. Veitch, trainmaster on the Idaho division of the Chicago, Milwaukee & St. Paul, with headquarters at Spokane, Wash., has been promoted to superintendent of the Olympic division, with headquarters at Port Angeles, Wash., effective December 22, succeeding W. H. Molchior, deceased.

Allan Pollok has been appointed manager of dining cars, hotels and restaurants of the Southern Pacific, with headquarters at San Francisco, Cal., effective January 1, succeeding **S. M. Estabrook,** who has been appointed assistant manager of dining cars, hotels and restaurants, with the same headquarters.

W. F. Thiehoff, who has been promoted to general manager of the Chicago, Burlington & Quincy, Lines West of

the Missouri River, with headquarters at Omaha, Neb., succeeding G. W. Holdrege, who has retired, effective January 1, was born on June 25, 1866, at Hunnewell, Mo. He entered railway service in 1883 as a section hand on the Chicago, Burlington & Quincy, and became a telegraph operator in 1885. From 1887, to May, 1889, he served as a freight brakeman, becoming a freight and passenger conductor on the latter date. After 16 years' service in this capacity, Mr. Thiehoff was promoted to trainmaster on the St. Joseph division, a position which he held until March 1, 1906, when he was transferred to the Brookfield division. He was promoted to assistant superintendent in 1907, and in July, 1908, he became superintendent of the Ottumwa division. He was transferred to the Beardstown division in February, 1911, and after service for 4 years in that position and as superintendent of the La Crosse division, he was promoted to general superintendent of the Nebraska district, with headquarters at Lincoln, Neb. At the time of his recent promotion, Mr. Thiehoff was serving as assistant general manager of the Lines West of the Missouri River, a position to which he had been promoted in July, 1916.

R. C. White, assistant chief engineer of maintenance of the Missouri Pacific, has been appointed general superintendent of the Eastern District with headquarters at St. Louis, succeeding **C. B. Wildman.** Mr. Wildman has been transferred to a similar position on the Western District with headquarters at Kansas City, succeeding **A. H. Webb,** who has been appointed superintendent of the Wichita division with headquarters at Wichita, Kan. Mr. Webb succeeds **J. E. Snedeker,** who has been appointed assistant superintendent of the same division. **W. C. Bevington,** superintendent of the Joplin division with headquarters at Nevada, Mo., who has been on a leave of absence because of illness, has again assumed his duties and acting superintendent **M. J. Crotty** has been appointed superintendent of the Central division with headquarters at Van Buren, Ark. **D. H. Robinson** has been appointed assistant superintendent of the Eastern division with headquarters at Sedalia, Mo., succeeding **G. B. Howden,** who has been appointed trainmaster of the Northern Kansas division with headquarters at Concordia, Kan. **J. C. Gerety,** trainmaster of the Colorado division with headquarters at Hoisington, Kan., has been transferred to a similar position on the Northern Kansas division with headquarters at Concordia, Kan. J. C. Gerety has been succeeded at Hoisington by **D. P. Gerety,** who was formerly trainmaster at Wichita, Kan. **S. E. Ridlon,** who was trainmaster on the Northern Kansas division at Concordia, Kan., has been tranferred to a similar position on the Missouri division with headquarters at Poplar Bluff, Mo. **D. W. Hickey,** assistant superintendent of the Colorado division, will hereafter have direct charge of the Horace district (including Horace yard) and general jurisdiction over the entire division. These appointments were effective January 1.

Traffic

R. H. Morris has been appointed general western freight agent on the Southern with headquarters at Chicago.

E. L. Mountfort has been appointed assistant traffic manager on the Gulf, Mobile & Northern, with headquarters at Chicago.

G. E. Littlefair has been appointed general agent of the Fort Worth & Rio Grande, with headquarters at Dallas, Tex., succeeding **C. A. Forrest,** who has been transferred.

Charles D. Semple has been appointed commercial agent on the St. Louis-San Francisco, with headquarters at San Francisco, Cal., and **W. L. Evans** has been appointed district passenger agent with the same headquarters.

W. F. Van Bergen, auditor of passenger accounts of the Chicago & North Western, with headquarters at Chicago, has retired after 55 years of continuous service with the North Western. **J. O. Clifford,** auditor of freight accounts, with headquarters at Chicago, has been transferred, succeeding Mr. Van Bergen. **E. J. Bloodgood,** auditor of freight overcharge claims, succeeds Mr. Clifford. **J. S. Fox,** assistant auditor of freight accounts, succeeds Mr. Bloodgood. **G. W. Nelson** has been appointed assistant auditor of freight accounts, succeeding Mr. Fox. The appointments and changes are effective January 1.

C. M. Davis, a member of the Southern Freight Rate Committee, Atlanta, Ga., at one time general freight agent of the Atlantic Coast Line, has been appointed assistant freight traffic manager of that company with headquarters at Wilmington, N. C., effective January 1.

Mechanical

A. Peers, division master mechanic on the Canadian Pacific, with headquarters at Moose Jaw, Sask., has been appointed master mechanic with the same headquarters, succeeding **W. J. Renix,** effective January 1.

E. A. Murray, master mechanic of the Chesapeake & Ohio with headquarters at Clifton Forge, Va., has been promoted to shop superintendent at Huntington, W. Va., effective January 1, succeeding H. M. Brown, resigned. **C. B. Hitch** succeeds Mr. Murray as master mechanic at Clifton Forge.

R. A. Pyne, superintendent of the motive power and car department of the Canadian Pacific, Eastern Lines, with headquarters at Montreal, Que., has been transferred to Winnipeg, Man., succeeding C. H. Temple, whose appointment as chief of motive power and rolling stock, with headquarters at Montreal, was announced in the *Railway Age* of December 31 (page 1184). **A. Sturrock,** master mechanic of the British Columbia district, with headquarters at Vancouver, B. C., has been promoted to assistant superintendent of motive power, with headquarters at Winnipeg, Man. The appointments and changes are effective January 1.

Engineering, Maintenance of Way and Signaling

G. W. Boschke has been appointed assistant chief engineer of the Southern Pacific, Lines West of Ogden, El Paso and Portland, with headquarters at San Francisco, effective January 1.

Paul Lebenbaum has been appointed assistant electrical engineer on the Southern Pacific, with headquarters at San Francisco, Cal., succeeding F. E. Geibel, who has resigned, effective January 1.

S. Morrison, acting district engineer on the Canadian National, Western Lines, with headquarters at Vancouver, B. C., has been appointed assistant engineer maintenance of way, with the same headquarters, effective January 1, with jurisdiction over all lines west of Edmonton, Alta., and including Vanucouver Island lines. The position of district engineer, Pacific district, has been abolished.

Obituary

W. H. Molchior, superintendent of the Olympic division of the Chicago, Milwaukee & St. Paul, with headquarters at Port Angeles, Wash., died of cancer at Seattle, Wash., on December 18, after a long illness.

Eugene H. Coapman, who was recently given a leave of absence as vice-president of the Southern, on account of illness, died on January 5 at his home in Washington, D. C. Mr. Coapman was born August 11, 1865, and had been in railway service since 1880. He began as messenger boy on the Chicago, Milwaukee & St. Paul and was later operator, train despatcher, chief train despatcher and superintendent of telegraph on various roads. On March 1, 1901, he became trainmaster on the Atchison, Topeka & Santa Fe. He went to the Southern in 1902 as superintendent of the Danville division. In 1905 he was promoted to assistant general superintendent of the Eastern district, in 1906 to general superintendent of the same district, in 1907 to manager of the same district, and in January, 1908, to manager of the entire system. In 1910 he was appointed general manager and in October, 1910, also vice-president. During federal control Mr. Coapman was federal manager of the Southern.